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INTERNATIONAL STATISTICS OF THE CONSUMPTION OF ALCOHOL.*

By Dr. E. W. Milliet.

A. Relative to the Collection of the Quantitative Data.

I. Notwithstanding their importance, the statistics of the human consumption of alcohol have so far generally been neglected in an unwarrantable manner. To be sure statistics of such consumption have received more careful attention than those of the consumption of other things. Nevertheless the data obtained even from this limited field of observation do not correspond to the importance of the subject nor to the demands of science. Finally the statistics of alcohol are endangered in their objectivity by the strenuous opposition of philanthropic and economic interests.

The Institute which we intend to create has therefore occasion enough to direct its attention to this branch of consumption statistics. To the inherent reasons must be added the outward circumstance that several other international associations have already besought the preparation of trustworthy international statistics of alcohol.

II. The existing data in regard to the consumption of alcohol in the different civilized countries are altogether fragmentary and of such incongruous content that a comparison for different periods of time within the same field of observation or in different fields of observation for the same period of time is not possible, or can be made only under reservations which render the value of the comparison illusory.

* These theses on international statistics of the consumption of alcohol were submitted by Dr. Milliet to the International Committee for the Scientific Study of the Alcohol question at its meeting at Paris in January of the present year. They are a part of his official report on the meeting of the International Committee to the *conseil fédéral* of Switzerland, and have not hitherto been given general publicity. Dr. Milliet, who is professor of law at the University of Bern, is perhaps the foremost authority in the world on statistics of alcohol. This lends a special interest and weight to his theses, aside from the fact that they will probably be made the basis of some of the work of the above mentioned International Committee. —Ed.

III. Every attempt to improve the material at hand necessarily predicates an incisive knowledge of it. As such knowledge as a rule exists only in the individual states and even there for the greater part is insufficient, the preparation for international statistics must be preceded by a thoroughgoing knowledge of the value of the national statistics.

IV. To make it possible to obtain such knowledge, it is proposed to have one reporter selected for each participating country; these reporters should together form a commission.

V. Each reporter should submit within a period of time to be determined later, and according to a questionnaire prepared by the commission, a report in regard to the extent and the statistical value of the existing data relative to the consumption of alcohol for this country and submit proposals for a better collection or preparation of such data. After the reports have been sent in, the commission shall decide in regard to further proceedings.

VI. The following questionnaire is a preliminary suggestion in regard to the program of work of the reporters.

1. Are data at hand concerning the entire country in regard to the production of

(a) Wine,
(b) Beer,
(c) Distilled spirits and brandy,
(d) Other alcoholic beverages,

and, if so, for what periods of time?

2. Are the data enumerated under No. 1 at hand only for certain parts of the country; if so, for what kinds of products, for what parts of the country, and for what periods of time?

3. Do the data in regard to the production of wine (1 and 2) include all wines, or only certain kinds; if the latter, which? (Wine from fresh grapes grown in the country, from fresh fruit or fresh berries grown in the country, from fresh imported grapes, from imported fresh fruit or fresh berries, from dried berries grown in the country or imported).

4. Do the data in regard to the quantities of wine of the different categories relate only to the products of the first pressing or also to those of a possible second or third pressing?

5. Do the figures in regard to wines of the different cate-

gories comprehend only the fermented products or also those consumed in a sweet or partly fermented condition?

6. Do the figures in regard to the production of beer also include the quantity brewed in private homes? If not, what is the general importance of the preparation of beer in homes?

7. Which categories of distilled spirits and brandy are included in the statistics, which not? (Distillation from raw material containing alcohol, from material containing sugar, from material containing starch).

8. What other alcoholic beverages besides wine, beer, and brandy are to be considered?

9. Are any data at hand in regard to the degree of alcohol contained in the alcoholic beverages produced, and which?

10. In what manner are the compilations in regard to the production of the different spirituous products obtained and what degree of trustworthiness may be claimed for them?

11. How are the compilations in regard to the importation and exportation of the different alcoholic products obtained and how far do the results correspond to actual conditions? For what products, regions, and periods of time are such compilations at hand?

12. What standard is used in transposing the imported brutto or net weights into measures of volumes?

13. Are there any data in regard to the percentage of alcohol contained in the different articles of importation and exportation, and which?

14. What changes do the produced or imported products undergo and what losses in quantity occur by working them over, by manipulation, by transport, etc., until they reach consumption or export?

15. What data are at hand in regard to the consumption of the different kinds of spirituous beverages according to quantity and degree of alcohol,

(a) for the whole country,
(b) for different parts of same,
(c) for single well-defined classes of society,
(d) for families or individuals?

How far can these data claim to be exact?

16. What part of the consumption is due to drinking and what part to industrial uses? (enumeration of the latter).

17. What money value is represented by the consumption

(a) for purposes of drinking,

(b) for industrial purposes?

That is, what do the consumers pay to satisfy their need for spirituous products (a and b)? How are the figures in question obtained and what degree of exactness may be attributed to them?

18. What is the approximate proportion of the population which is abstinent in regard to alcoholic beverages?

19. Is the population of consumers a very fluctuating one for the whole country or for different parts of it?

20. What are the sources from which the statistics of the consumption of alcohol are obtained? What criticism is to be made in general concerning the methods used in the collection, preparation, and publication of these statistics?

B. Concerning the Utilization of the Data, Taking into Consideration the Varying Effect of the Different Beverages by Means of Weighted Values.

The usual comparison of the consumption of alcohol consists in that the average quantities of each beverage consumed per head of an assumed population are reduced to absolute alcohol and then contrasted. Thus we find in one of the most recent works (Grosjahn & Kaupp) the following figures for the five year period, 1901–1905:

	Liquid Liters.			Liters Absolute Alcohol.			Total.
	Beer.	Wine.	Spirits at 50%.	Beer.	Wine.	Spirits.	
France	36.0	139.0	7.00	1.40	16.70	3.50	21.60
Italy	98.0	114.0	1.30	0.03	13.70	0.65	14.40
Belgium	218.0	4.6	7.00	8.70	0.55	3.50	12.80
Switzerland	64.0	74.0	4.00	2.60	7.40	2.00	12.00
Denmark	95.0	1.5	14.10	2.69	0.18	7.05	9.90
Great Britain and Ireland	133.0	1.6	5.20	6.65	0.24	2.60	9.50
German Empire	119.0	6.6	8.10	4.76	0.66	4.05	9.50
Austro-Hungary	42.0	17.7	10.30	1.68	2.12	5.15	8.95
Bulgaria	1.7	51.4	1.35	0.68	6.17	0.68	7.50
U. S. A.	67.0	1.8	5.30	3.35	0.27	2.65	6.30
Sweden	59.0	0.6	7.60	1.67	0.13	3.80	5.60
Rumania	1.0	21.0	4.00	0.04	2.52	2.00	4.60
Russia	4.5	4.0	5.20	0.18	0.60	2.60	3.40
Norway	15.7	1.6	3.20	0.60	0.20	1.60	2.40
Finland	10.2	0.5	2.80	0.34	0.60	1.40	2.30

To judge from this, *according to the consumption of absolute alcohol*, France would have a showing 9½ times less favorable than Finland. Does this proportion, considered from the point of view of the actual effect of the consumption of the different alcoholic beverages, correspond to actual conditions? Is it at all admissible that the percentage of alcohol should be the only consideration in judging these effects? Is it at all admissible that the consumption of a quart of natural wine with 8 per cent. of alcohol should be placed in the same line with the consumption of a fifth of a quart of spirits containing fusel oil and having 40 per cent. of alcohol? These questions we necessarily must answer in the negative.

In the above ranking of states, France and the other countries immediately following are found to stand at the head chiefly because they show a high consumption of wine or beer. Inasmuch as we know from daily experience as well as from experiments and from the statistics bearing on the consequence of the consumption that the different alcoholic beverages show a varying effect, a correct ranking of the countries can only be obtained when we give due consideration to the various effects by the use of suitable coefficients.

However, *the measure* to be applied to the varying influence of the single beverages is not yet sufficiently known so that we can determine the proper statistical weights at the present time. It is therefore a necessary and important task for the institute about to be created to provide the necessary basis for the differential treatment by inquiry into the effect not only of alcohol as such, but also of the various concrete forms in which it is consumed.

Generally speaking, wine is the least harmful and spirits the most harmful beverage. Cider and beer occupy intermediate positions. If we start—to be sure, somewhat arbitrarily—from the assumption that the injury resulting from spirits is 4 times, that from cider, 2½ times, and that from beer is 1½ times as great as the injury consequent upon the consumption of wine, then we obtain, on the basis of the figures at our disposal, the following weighted average values (weighted means) concerning the three countries France, Switzerland, and Norway:

AVERAGE YEARLY CONSUMPTION IN HL OF ABSOLUTE ALCOHOL.

	With Regard to Differential Coefficients of Effect.			Without Regard to Differential Coefficients of Effect.		
	France.	Switzerland.	Norway.	France.	Switzerland.	Norway.
Wine	6,769,070	307,545	2,447	6,769,070	307,545	2,447
Beer	711,900	98,980	17,070	1,067,850	148,470	25,605
Cider	480,800	53,025	.....	1,202,000	132,563	.....
Spirits	1,346,190	102,515	29,786	5,384,760	410,060	119,144
Total	9,307,960	562,065	49,303	14,423,680	998,638	147,196

Assuming an average population for France of 38,845,000
for Switzerland of 3,535,000
and for Norway of 2,333,000

the consumption per head amounted

	according to the simple arithmetical mean to liters	according to the weighted mean to liters
France	23.96	37.13
Switzerland	15.90	28.25
Norway	2.12	6.31

According to the prevailing method France would appear to be 1½ times more alcoholized than Switzerland, and about 11 times more than Norway. According to the new method used, its relation to Switzerland would be about 1⅓ and to Norway only 6. And the relation of Norway to Switzerland would be 1 to 7½ according to the old method, but according to the new method of only 1 to 4½.

Although the new relative figures do not as yet rest upon a basis to which no objection can be raised, they nevertheless approach in our opinion more closely the truth than the old figures.

C. Utilization of Data by Measuring the Weighted Mean Figures against an Ideal Consumption.

Inasmuch as up to the present time it has nowhere been possible to determine the actual individual consumption for large classes of population, one is forced to ascertain the per

capita consumption from the general consumption. The method used in this connection starts practically without exception with the total population. By this process, many important circumstances are neglected and it is certainly out of the question to overcome all the defects adhering to it. On the other hand, our institute-to-be would surely render a service if it made possible corrections an object of its studies. We should regard it as a distinct improvement if, for instance, the questions of sex, of relative age, and of the domicile of the population were taken into consideration. As a possible method of procedure we would suggest a measurement of the per capita consumption, ascertained according to the weighted mean, as against an ideal consumption, that is, one whose existence would no longer admit of alcoholism being spoken of as a national disease. As an ideal consumption, we should, for instance, regard one amounting annually to the quantities of absolute alcohol per head given below:

	For the Population of Cities.	For the Rural Population.
Children of 15 years and under	0	0 Liters
Females over 15 years	4	6
Males over 15	6	9

The three states which we discussed under B showed approximately the following groups of population for the period 1905—1909.

Ages (as above).	France.		
	Cities.	Country.	Total.
Children	2,643,000	7,447,000	10,090,000
Adults, female	4,880,000	9,840,000	14,720,000
Adults, male	4,287,000	9,748,000	14,035,000
Total	11,810,000	27,035,000	38,845,000
	Switzerland.		
Children	225,000	932,000	1,157,000
Adults, female	305,000	913,000	1,218,000
Adults, male	260,000	900,000	1,160,000
Total	790,000	2,745,000	3,535,000
	Norway.		
Children	215,000	612,000	827,000
Adults, female	250,000	555,000	805,000
Adults, male	195,000	503,000	698,000
Total	660,000	1,670,000	2,230,000

If we apply to these groups of population the per capita percentage assumed, the average annual *ideal consumption* for 1905–1909 would be as follows:

		Compared with the Weighted Average Figures.
France	1,920,140 HL	14,423,680 HL
Switzerland	163,580	998,638
Norway	100,270	147,196

According to these figures we get the following percentages of the ideal weighted average consumption:

France..... 751 per cent.
Switzerland..... 610 per cent.
Norway..... 147 per cent.

We deduce from this that while Norway has attained much nearer to the ideal than the two other countries, even there much remains to be done in the combat against an excessive use of alcohol.

BENEVOLENT HOSPITALS IN METROPOLITAN BOSTON.*

By William H. Mahoney.

Development of the Hospital System.

The first hospital to care for the indigent sick of Boston was established in 1821. Previously free medical service had been furnished by two agencies, the Boston dispensary and the almshouse. The need for a hospital had been repeatedly pointed out, but not until 1821 did the Massachusetts General Hospital open its doors to patients. Its stated object was to "cure the insane and other sick." Furnishing treatment for all diseases, it covered the field so well that for over forty years no other institution for similar work was established.

Though specialization is notably a development of the present generation, the next two units added to the hospital system were special hospitals. A group of surgeons felt the need of adequate provision for the treatment of diseases of the eye, yet they were not sure that the demand was sufficient to warrant asking the public for financial support. So, without asking aid, word was circulated among the poor that those needing treatment of the eye might receive it gratuitously. At the end of fifteen months, 856 persons had been treated and, as knowledge of the work became more general, the number of applicants increased rapidly. This was the beginning of the Massachusetts Charitable Eye and Ear Infirmary in 1824, the first agency of its kind in America. Fourteen years earlier London had opened a similar institution.

The second special hospital was established more than thirty years later to treat incurable diseases. In 1833 the

*The data on which this article is based were gathered while the writer held a fellowship in the Research Department of the Boston School for Social Workers.

Geographically, the scope of the study includes the area bounded by the towns of Winthrop, Revere, Melrose, Medford, Winchester, Arlington, Belmont, Watertown, Newton, Hyde Park, Milton and Quincy. This circle of towns, together with the area enclosed by them, is accepted as constituting Metropolitan Boston, while the portion of the area which lies outside Boston proper is referred to as Suburban Boston. State and national institutions and institutions caring for defectives are omitted. City hospitals, hospitals and dispensaries incorporated for benevolent medical work, as given in the reports of the State Board of Charity, and hospitals and dispensaries listed in the 1907 Boston Directory of Charities, constitute the group which form the basis of the study.

Massachusetts General Hospital determined no longer to treat incurable or chronic cases. For such there remained only the almshouse. Largely by the effort of Miss Harriet Ryan, the Channing Home, for the treatment of incurable diseases, came into existence in 1857. The number of patients at one time was limited to fifteen, since the care of that number was "as much as one woman could do." As Miss Ryan was devoting her mornings to her work as a hairdresser in order to earn money for the institution, and in the late afternoon often went about with a basket to collect food for her patients, this assumption was probably correct.

The real growth of the hospital system in Boston dates from about 1860, as is shown in the following table:

TABLE I.

NUMBER OF GENERAL AND SPECIAL HOSPITALS IN METROPOLITAN BOSTON, BY DECADES, 1860-1910.

Year.	Total Number of Hospitals.	Number of Hospitals in Boston.		Number of Hospitals in Suburban Boston.	
		General.	Special.	General	Special.
1860	3	1	2	–	–
1870	10	3	7	–	–
1880	17	4	12	–	1
1890	23	5	14	3	1
1900	35	7	20	6	2
1910	41	8	21	9	3

During the decade following 1860, seven hospitals were opened in Boston. Thus over forty years had elapsed after the opening of the Massachusetts General Hospital in 1821 before two additional general hospitals, the Boston City Hospital and Carney Hospital, opened their doors in 1864. These two are the last of the larger general hospitals which do not in some way limit their service to smaller groups in the community. The two other large hospitals which are so limited are the Massachusetts Homeopathic Hospital, opened in 1871, and the pauper hospital at Long Island, opened in 1887. The Homeopathic Hospital was founded specifically for treatment of adherents of the homeopathic school of medicine. To enter the Long Island Hospital one must declare oneself a

pauper. Since 1890, three general hospitals, all smaller than the preceding ones, have been opened in Boston.

The system which so early included specialized institutions has continued in the same direction, and by far the greater number of institutions added since 1860 are special hospitals. The next organization created for special work was the Massachusetts Infant Asylum in 1864. The infant death rate at the crowded almshouse was very high, at times approaching 100 per cent. The fact that "mothering" and proper care had been difficult at the almshouse is indicated by the quick reduction of the death rate which followed the system introduced by the Massachusetts Infant Asylum.

About one half of the special hospitals added during the next two decades were chiefly for women. Preceding 1870, the New England Hospital for Women and Children and St. Elizabeth's Hospital had been opened. After 1870, St. Mary's Infant Asylum and Lying-in Hospital, the Boston Lying-in Hospital, and the Free Hospital for Women were founded. New lines of work were also inaugurated by the establishment of an institution for nervous cases and a home for convalescents. At the same time, classes of work previously begun were augmented by a children's hospital, an institution for chronic cases and another for tuberculosis.

Between 1880 and 1890, one hospital for infants and another for incurables were the only institutions added. After 1890, the trend toward specialization set in more strongly than ever. In fact, the great increase in the total number of institutions during the decade from 1890 to 1900 is due in part to the establishment of hospitals in suburban towns but chiefly to the addition of special hospitals in Boston proper, where the majority of such institutions are located. Two institutions for women, two for incurables, one for children and one for tubercular patients, added during this period, all duplicated existing institutions.

Meantime, the so-called general hospitals were creating separate departments for new special work or further separating work already undertaken. Contagious, maternity, and children's departments early found favor in more than one general hospital, This division of functions within the

general hospitals reached its height between 1890 and 1900, i. e., at the time when the largest number of hospitals for special work were established. Ten departments were added to general hospitals at this time, or twice as many as during any previous decade.

Only six hospitals were added between 1900 and 1910, a much smaller number than during the previous decade. Moreover, three of these were general hospitals in Suburban Boston. It is evident that fewer hospitals were added during this decade in Boston than during any other, except one, since 1860.

The rapid development in the hospital system since 1860 has been marked not only by the increase in the number of hospitals but by an increase in hospital facilities as measured by the number of beds and by a more than corresponding growth in the number of patients. The developments are shown in the following table:

TABLE II.

NUMBER OF BEDS AND PATIENTS IN THE HOSPITALS OF METROPOLITAN BOSTON, BY DECADES, 1860-1910.*

Year.	In Metropolitan Boston.			In Boston.			In Suburban Boston.		
	Number of Beds in		Number of Patients.	Number of Beds in		Number of Patients.	Number of beds in		Number of Patients.
	General Hospitals.	Special Hospitals.		General Hospitals.	Special Hospitals.		General Hospitals.	Special Hospitals.	
1860.....	180	43	1409	180	43	1409	—	—	—
1870.....	484	121	4621	484	121	4621	—	—	—
1880.....	737	295	9834	737	280	9774	—	15	90
1890.....	1339	493	17243	1253	473	16505	86	20	738
1900.....	1895	1300	33538	1615	1250	30641	280	50	2897
1910.....	2400	2077	52319	1946	1882	45467	454	195	6852

The increase in the number of beds, a truer index of growth than the addition of new hospitals, has resulted from the enlargement of existing hospitals,† as well as from the addition of new units. The percentage of increase in hospital

* Convalescent departments of the general hospitals are here included with the general hospitals. This and the subsequent derived tables in this chapter may not be absolutely accurate, for old records are incomplete and in some cases no records have been found. The uncertainties occur, however, for the smaller institutions during their earlier years and such possible lapses do not invalidate the table for the purpose of showing the growth of the hospital system.

†For example, The Massachusetts General Hospital, which in 1826 had 43 beds, in 1847 had 150 beds, and in 1850 the Massachusetts Charitable Eye and Ear Infirmary moved into a new building.

beds in Metropolitan Boston by decades is as follows: from 1860 to 1870, 171 per cent.; 1870 to 1880, 70 per cent.; 1880 to 1890, 77 per cent.; 1890 to 1900, 74 per cent.; 1900 to 1910, 40 per cent. The number of beds was almost trebled between 1860 and 1870. The sudden growth occasioned largely by the opening of the Boston City Hospital and Carney Hospital was due to various reasons. The number of hospital beds had not kept pace with the steady growth in the population of Boston and the death rate in the city had been high.* The number of beds has grown at the rate of at least 70 per cent. during each decade up to 1900. As in the addition of new hospitals, the relative increase in the number of beds was also much less during the decade following 1900 than in any decade preceding that date.

That hospital facilities, measured by the number of beds, have grown much more rapidly than population, is shown in the following table:

TABLE III.

RATIO OF HOSPITAL BEDS TO GENERAL POPULATION IN METROPOLITAN BOSTON, BY DECADES, 1860–1910.

Year.	Number of Persons to Each Hospital Bed in		
	Metropolitan Boston.	Boston.	Suburban Boston.
1860	1220	797	—
1870	643	414	—
1880	537	356	12790
1890	401	259	2712
1900	307	195	1272
1910	266	175	805

Between 1860 and 1870 the number of hospital beds in Metropolitan Boston increased about twice as fast as population and has since continued to outrun population, though at a much lower rate. The rates of decrease in the number of persons to each hospital bed are as follows: 1860 to 1870, 47 per cent.; 1870 to 1880, 16 per cent.; 1880 to 1890, 25 per cent.; 1890 to 1900, 23 per cent.; 1900 to 1910, 13 per

*Reports of the Health Department of the City of Boston.

cent. This growth for the metropolitan district has been determined largely by the development in the city of Boston, where by 1890 the accommodations were relatively more ample than at the present time for the entire area. In the city proper, the growth has been consistent and shows a steadily increasing service.

In the suburbs, provisions for hospital accommodations have been less adequate at all stages. In fact, the ratio of beds to population reveals less ample accommodations in the suburban towns in 1910 than existed in Boston proper in 1860. The relative increase in hospital beds provided, however, has been very rapid. Since 1880 the number has increased fifteen times as fast as the population in the suburban towns, while in Boston it has increased but twice as fast. Since 1900 the growth has not been so rapid. While the increase in hospital beds in Boston has little more than kept pace with the population during the decade preceding 1910, in the suburbs it has been about one and one half times as great.

A recent writer states that the "normal" number of hospital beds in the United States per 100,000 population in 1910 was "about 228."* Considering Boston proper, it is found that the number of hospital beds per 100,000 population is far above "normal," *i. e.*, it is 570, and for Metropolitan Boston the corresponding number is 375.

The availability of hospital beds has been further increased by the shortening in the average length of stay of the patients. Combining the average stay of patients at the Massachusetts General Hospital, the Boston City Hospital, and the Massachusetts Homeopathic Hospital, the resulting average stay is, for 1880, 34 days; for 1890, 23 days; for 1900, 20 days; for 1910, 16 days. Eight out of nine hospitals had a shorter average stay per patient in 1910 than in 1905. The maximum decrease was 3.5 days. The one in which the stay increased, showed an increase of 0.8 of a day. The decrease for the nine hospitals in 1910 when compared with 1905 was 1.6 days. This general decrease may have been due in part to increasing pressure of larger numbers of patients for admission, to

*Dr. Charles P. Emerson in *Hospital Management*, Aikens, p. 28.

changes in ideas of medical treatment, to the acceptance of patients suffering from less serious diseases, many of them of shorter duration, and to the growth in facilities for convalescent care.

The extent to which the increased facilities have been used to accommodate more patients is shown in the following table:

TABLE IV.

RATIO OF HOSPITAL POPULATION TO GENERAL POPULATION IN METROPOLITAN BOSTON, BY DECADES, 1860-1910.

Year.	Number of Hospital Patients to Each 100,000 General Population in		
	Metropolitan Boston.	Boston.	Suburban Boston.
1860	517	792	—
1870	1186	1844	—
1880	1772	2685	47
1890	2342	3680	256
1900	3419	5462	689
1910	4386	6780	1312

From 1860 to 1910 the number of hospital patients in Metropolitan Boston has increased more than eight times faster than the general population. The ratio in 1910, 4,386 patients for every 100,000 population, is far above the average for the United States.*

As in regard to the number of beds, so the relative increase in the use of hospital facilities was most marked during the first decade under consideration, which shows an increase of over 130 per cent. The exact increase by decades is as follows: from 1860 to 1870, 131 per cent.; from 1870 to 1880, 49 per cent.; from 1880 to 1890, 32 per cent.; from 1890 to 1900, 45 per cent.; from 1900 to 1910, 28 per cent. Except for the increase between 1890 and 1900, due in part to the opening of many new hospitals, the percentage of increase over the fifty years shows an expected downward trend; but the figures indicate a consistent growth in the use of hospital facilities.

*In 1904 there was an average of 1,300 hospital patients per 100,000 population in the United States *Benevolent Institutions*, 1904. John Koren.

No hospitals were opened in the suburban cities until 1880, but subsequently, the proportion of the population using them increased faster in the suburbs than in Boston, although it is not yet one fifth as large as in Boston.* Such rapid growth is largely due to the previous scarcity of beds.

The relation of the growing hospital population to the number of persons reported as sick is difficult to measure. General morbidity statistics covering any period of time do not exist. The average number of contagious cases reported in Boston per 100,000 of population for the ten years ending 1910 was about 4 per cent. less than that for the ten years ending 1900.† Apparently the rate for these diseases is decreasing. The increased use of the hospitals can probably be attributed to congestion of population, an increasing proportion of which lives in apartments, and to the growing appreciation of good nursing and of adequate medical facilities, influencing more and more people, who formerly remained at home, to seek these institutions during illness.

Present Size and Adequacy of the Hospital System.

In 1910 the hospital system of Metropolitan Boston consisted of forty-one organizations. During that year these institutions maintained 4,477 beds and provided a total of 1,054,999 hospital days' care for 52,319 patients.‡ The importance of the public hospitals to the community is indicated by all three of these figures, but chiefly by the large number of patients receiving the benefits of the hospitals during the year, a number equal to about 4 per cent. of the population of Metropolitan Boston, or an average of one person in every 25.

To measure the relation between the number of patients

*Increase 1880 to 1890, 450 per cent.; 1890 to 1900, 170 per cent.; 1900 to 1910, 85 per cent. There has been a similar growth in the use of hospital facilities in London from 1900 to 1910 since the population increased 10 per cent. and the hospital population 27 per cent. Hospitals and Charities, 1902 and 1912. Burdett.

†Includes smallpox, diphtheria and croup, measles, scarlet fever, and typhoid fever. Reports of the Health Department of the City of Boston.

‡These figures do not include persons treated in the out-patient departments, or the work of the private hospitals. An unsuccessful attempt was made to gather a brief statement showing the extent of the work of the latter. This was to have been used for comparative purposes only, since such organizations are not benevolent, their average size is small and they care for a well-to-do class of patients.

and the number of persons in Metropolitan Boston who are sick, is difficult. The Massachusetts census for 1905 made a tabulation of the acute and chronic sick in the state at the time of the census.* From this a morbidity rate, "accurate for the population considered,"‡ has worked out for the state as follows: "For acute diseases 1.13 per 1,000 population, and for chronic diseases 7.19 per 1,000 population."† This gives 8.32 persons sick per 1,000 population.

Applying this morbidity rate to the population of Metropolitan Boston in 1910 would mean that there were always 9,924 persons sick within this area.‡ The total daily average of persons receiving treatment in the benevolent hospitals in 1910 was 2,968, which indicates that approximately 30 per cent. of the sick obtain such care. Allowing for the two institutions for which the daily average number of patients was not obtainable, it is probable that not quite one sick person in every three in Metropolitan Boston seeks care at the public hospitals.§

In 1910 the hospitals of Boston treated 45,467 persons, and those of Suburban Boston, 6,852 persons, indicating that during 1910 approximately one person in 15 in Boston, and one person in 76 in Suburban Boston made use of the hospital service.¶ The chief explanation of this striking difference between the Boston and Suburban Boston figures is that many sick from Suburban Boston, as well as from outside Metropolitan Boston, seek the care of Boston hospitals.

In Metropolitan Boston one hospital bed was maintained for every 266 inhabitants. A comparison of Boston accommodations with those of certain British cities is of interest, even

*Labor Bulletins, Massachusetts Bureau of Statistics, October and November. 1907.

†Frederick L. Hoffman in the Spectator for December 19 and 26, 1907.

‡The possible error in applying to Metropolitan Boston a rate based on the entire state is less than might be expected because between 18 and 19 per cent. of the chronic cases, and over 37 per cent. of the acute cases, were located in Suffolk County. Conditions determining the amount of sickness have varied so little since 1905 that this morbidity rate is probably reasonably applicable in 1910.

§To some this proportion may seem high. In the report of the Bureau of Statistics which contained this material, the following statements appear: "Of the total (4,170) 2,048 received treatment at home and 2,104 received hospital treatment. . . . There were 18 instances in which information on this point was not ascertained." Labor Bulletin, October, 1907. This applies only to those suffering with acute diseases,—unfortunately chronic patients are not so classified,—and would indicate for these cases that 50 per cent. of those acutely sick at that time sought hospital care.

¶The population of Metropolitan Boston in 1910, 1,192,800, was composed of 670,585 persons living in Boston and 522,215 living in Suburban Boston.

though the conditions which affect the health of the different communities vary considerably. The following list includes benevolent hospital beds for all purposes:*

Birmingham—one bed to each 990 persons.
Cardiff—one bed to each 766 persons.
Manchester—one bed to each 619 persons.
Newcastle-upon-Tyne—one bed to each 547 persons.
Bristol—one bed to each 528 persons.
Glasgow—one bed to each 490 persons.
London—one bed to each 470 persons.
Liverpool—one bed to each 458 persons.
Belfast—one bed to each 438 persons.
Brighton—one bed to each 401 persons.
Portsmouth—one bed to each 347 persons.
Edinburgh—one bed to each 270 persons.
Dublin—one bed to each 160 persons.

Only one city in the above list, Dublin,† shows more ample provisions for hospital patients than Metropolitan Boston which has one bed to each 266 persons. Edinburgh, a city noted for its hospital system, has accommodations practically equal to those in Boston, the other cities having much smaller per capita bed accommodations.

The total of 4,477 hospital beds under consideration is composed of 3,828 in Boston and 649 in Suburban Boston, which, compared with population, gives one bed to each 175 persons in Boston and one bed to each 805 persons in Suburban Boston. The area which the suburban beds serve is something over three times that of Boston proper. This sparseness of suburban beds explains in part the large number of beds per capita in Boston proper, which again partially accounts for the unequal distribution of patients previously indicated.

Two factors modify conclusions relative to the apparent adequacy of hospital facilities in Metropolitan Boston. First, the division and use of beds according to general and special work; and second, the location and accessibility of these beds in relation to centres of population. The importance of loca-

**Hospitals and Charities*, 1907. Burdett.

†No explanation is offered regarding this remarkable figure for Dublin except to suggest that it is so unusual as to warrant a suspicion of possible error. *Hospitals and Charities*, 1907, p. 70. Burdett.

tion can hardly be overestimated. From the viewpoint of the patients to be cared for a system of scattering, rather than of grouping institutions doing similar work, would seem to be desirable.

The accommodations maintained and the number of patients treated in the general hospitals of Metropolitan Boston during 1910 are first presented in the following table:

TABLE V.

ACCOMMODATIONS AND NUMBER OF PATIENTS TREATED IN THE GENERAL HOSPITALS OF METROPOLITAN BOSTON, BY INSTITUTIONS, 1910.

Hospitals.*	Number of Patients Treated.		Total Number of Beds.
	Total.	Daily Average.	
All hospitals	34,356	1,718	2,311
Boston hospitals	28,666	1,443	1,857
Suburban Boston hospitals	5,690	275	454
Boston Hospitals:			
Number 1	3,674	138	170
Number 2	6,392	289	324
Number 3	10,834	433	655
Number 4	4,341	202	250
Number 5	1,361	297	325
Number 6	573	22	53†
Number 7	1,051	43	50
Number 8	440	19	30
Suburban Boston Hospitals:			
Number 9	386	21	25
Number 10	1,749	98	150
Number 11	236	10	18
Number 12	895	37	80
Number 13	567	26	40
Number 14	806	37	60
Number 15	97	11	11
Number 16	63	3	10
Number 17	891	32	60

* Numbers are used to avoid revealing the identity of hospitals.
† During six months uses only 35 beds.

Approximately 83 per cent. of the 34,356 patients treated in the general hospitals of Metropolitan Boston were cared for by the institutions located in Boston proper, which contains 56 per cent. of the whole population; and 17 per cent. by the nine institutions of Suburban Boston. The fact that the older institutions in the city may attract certain patients from outside Metropolitan Boston by no means accounts for this condition. It is another indication that many residents who desire general hospital treatment came to Boston institutions in preference to those nearer home.

In 1910 the total number of beds in the general hospitals of Metropolitan Boston was 2,311, or one such bed for every 516 persons. New York, the only city with which comparison of such figures is possible, maintained in 1907 one bed for treating general diseases for each 392 of population.* The author of the study of hospital conditions in that city suggested the immediate addition of 500 beds in the general hospitals of New York, which would give one bed for each 375 persons.† The report pertinently calls attention to the importance of the distribution of the beds rather than the total number. Certainly in the matter of total beds for general work Metropolitan Boston is not as well supplied as New York, but Boston proper, with one general hospital bed for each 361 persons, is better supplied than New York would be with the suggested additions. Probably the number of special hospitals and the difference in the number of beds set aside for special work in the general hospitals reduce the value of such comparison.

In order to measure accurately the relation between the number of beds in general hospitals and the demand for service in such hospitals, it is necessary to take into account the length of time which the patients spend in the hospital. Not only does the length of this stay vary over a period of years as has been shown, but it varies constantly between hospitals doing similar work. Table VI takes into account the length of time each patient was at each hospital by using the total number of hospital-days' care given by each institution.

It will be seen that approximately 84 per cent. of the total number of days' care actually given was furnished by the hospitals located in the city of Boston, which is even a larger proportion of work, in favor of the city proper than indicated by the division of the beds. Comparing the ratio of actual work to possible work it is shown that the use of the Boston service exceeded that of Suburban Boston by 17 per cent.

**New Hospitals Needed in Greater New York.* Jacobs. In 1907 there were 10,926 beds in the general hospitals in Greater New York. The official estimate of the Department of Health of New York City gives the population of the city for that year as 4,285,435.

†*Ibid.*, p. 18.

TABLE VI.

RELATION BETWEEN THE ACTUAL USE AND THE POSSIBLE USE OF HOSPITAL ACCOMMODATIONS IN THE GENERAL HOSPITALS OF METROPOLITAN BOSTON, BY INSTITUTIONS, 1910.

Hospitals.*	Number of Hospital Days.		Per Cent. of Actual Use to Possible Use.
	Possible if the Beds Were Constantly Occupied.†	Actually Given.	
All hospitals	840,221	631,566	75.2
Boston hospitals	674,511	530,133	78.6
Suburban Boston hospitals	165,710	101,433	61.2
Boston Hospitals:			
Number 1	62,050	50,345	81.1
Number 2	118,260	105,617	89.3
Number 3	239,075	158,161	66.2
Number 4	91,250	73,607	80.7
Number 5	118,625	108,405	91.4
Number 6	16,051	10,982	68.4
Number 7	18,250	15,834	86.8
Number 8	10,950	7,182	65.6
Suburban Boston Hospitals:			
Number 9	9,125	7,760	85.0
Number 10	54,750	35,856	65.5
Number 11	6,570	3,543	53.9
Number 12	29,200	13,761	47.1
Number 13	14,600	9,376	64.2
Number 14	21,900	14,498	66.2
Number 15	4,015	3,880‡	96.6
Number 16	3,650	1,260	34.5
Number 17	21,900	11,499	52.5

* Numbers are used to avoid revealing the identity of hospitals.

† The figures given in the first column as the "number of hospital days possible if the beds were constantly occupied" are obtained by multiplying the average number of beds maintained during 1910 by the number of days in operation during that year (usually 365).

‡ Computed from the total number of patients and the average stay per patient.

Because of the constant changing of patients and the reservation of beds in groups for the care of special diseases, the most efficient service demands that a certain margin of beds should be constantly vacant. Estimates of the proper proportion of the whole to be so reserved range from 10 to 20 per cent. Mr. Jacob's study of hospital conditions in New York states that, "At least one tenth of the beds must be constantly in reserve and about another one tenth is very likely to be in reserve on account of poor location or for some other reason." Others place the desirable surplus at about 12 or 15 per cent.

The percentage of actual use to possible use for the beds in the general hospitals of Metropolitan Boston was 75.2 per cent. In other words, approximately one fourth of the beds in the general hospitals were idle all of 1910, or, stating it dif-

ferently, each of the beds in general hospitals was idle one fourth of the time during 1910. It will be seen that two hospitals have a usage of over 90 per cent. Both are hospitals connected with almshouses and for the treatment of declared paupers only. Leaving these out of consideration for the moment, the percentage of actual use to possible use in the hospitals of Metropolitan Boston drops to 72 per cent. and in Boston proper to 76 per cent. Exclusive of these two institutions there are but two hospitals with more than 85 per cent. of actual to possible use, while Boston proper has three hospitals with less than 70 per cent. of usage and Suburban Boston has but one that is over 70 per cent. In Boston proper the relation of use to possible use was over 3 per cent. higher than the average for the entire area. Assuming that 20 per cent., the highest estimate found, is the desirable margin of unused beds would leave 1.4 per cent. of the general hospital accommodations in Boston proper as unnecessary. This is a trifle over 25 beds. If one assumes 10 per cent., the lowest estimate found anywhere, to be the desirable margin of unused beds, then 11.4 per cent. or 212 beds, in the general hospitals in Boston proper are unnecessary. Probably the number of unnecessary general hospital beds in Boston is somewhere between 25 and 212. Applying the same measure to the beds in Suburban Boston would show even a greater relative number of beds idle. The figures for twelve general hospitals in the United States, including two located in Boston, show an average of about 72 per cent. of use to possible use in 1910.* This figure is low because several of the institutions are much below the average in the proportion of unused beds. For example, 45 per cent. of such beds in one hospital and 54 per cent. in another unquestionably indicate a surplus bed supply in those institutions. No general hospital in Boston proper shows nearly so low a percentage of use as the two just specified and yet the average for Metropolitan Boston is within 3 per cent. of the average for the institutions quoted. Figures for twenty-six general hospitals in London indicate 87 per cent. of use to possible use during 1910.†

**Hospitals and Charities*, 1912. Burdett.
†*Ibid.*

Compared with other cities, then, Boston proper shows a low relative use of its general hospital facilities, and this condition is true in spite of the fact that the city is caring for a large number of suburban patients. This is of interest in view of the new general hospitals about to be opened in Metropolitan Boston.

The units which compose the general hospital system in Boston show considerable variation, at least one half of them being below the maximum possibility of efficiency. Institutions numbers 2 and 7 show the highest usage, while the minimum is found under numbers 3 and 8. It will be observed that the hospital with the largest bed possibility in Suburban Boston has a usage of but 65 per cent. This is a result of a ruling of the trustees restricting admissions, so that about this proportion of beds will be in use. The figures for Suburban Boston suggest the opportunity for development in other, possibly special directions, if the effort to care for a greater proportion of their rightful general patients is unsuccessful. Not only is the average of all Surbuban Boston hospitals lower than the average of those in the city proper but there is only one hospital in the district (except the pauper hospital previously mentioned) which shows as much as 70 per cent. of use to possible use. In the suburbs the circumstance that the institutions are scattered and not easily accessible from large parts of the district, although a modifying factor, cannot entirely justify such a large waste. The fact is that the sick in these localities, even where hospitals are provided, do not go to their own hospitals for treatment.

In many general hospitals, especially those of larger size, a definite part of the equipment is given over to the care of special cases.* Approximately twenty-five such special departments are maintained and these are scattered over 11 different kinds of work. The division of beds, *i. e.*, the proportion reserved for general medical and surgical cases and the proportion assigned to special cases, is of importance in considering the adequacy of the system. Classifying the two large contagious "departments" as special hospitals, which they really are,

*One general hospital located in Boston proper, and five located in Suburban Boston, confine themselves, at least nominally, to general work.

approximately 80 per cent. of the beds in the general hospitals are devoted to general work. Five hospitals maintain maternity departments and five children's departments, but only 5 per cent. of the total beds are so reserved. Convalescent work occupies about 4 per cent. of the beds and gynecological work about 3 per cent. The remaining special beds are scattered over such departments as contagious, orthopedic, eye and ear, etc. It will be of interest to consider the extent of such special accommodations in general hospitals in connection with the work of the special hospitals, which is shown in the following table:

TABLE VII.

ACCOMMODATIONS AND NUMBER OF PATIENTS TREATED IN THE SPECIAL HOSPITALS OF METROPOLITAN BOSTON, BY INSTITUTIONS, 1910.

Hospitals.*	Number of Patients Treated.		Total Number of Beds.
	Total.	Daily Average.	
All hospitals†	17,963	1,250	2,166
Infants and Children:			
Number 18	1,678	65	100
Number 19	289	12	24
Number 20	217	21	24
Number 21	462	95	125
Women:			
Number 22	1,347	69	146
Number 23	214	18	30
Number 24	233	10	24
Number 25	989	70	160
Number 26	464	35	59
Lying-in:			
Number 27	260	‡	145
Number 28	863	38	52
Nervous Diseases:			
Number 29	187	45	51
Eye and Ear Diseases:			
Number 30	3,556	150	210
Contagious Diseases:			
Number 31	3,025	264	340
Number 32	483	49	140
Chronic and Incurable Diseases:			
Number 33	195	42	43
Number 34	315	‡	117
Number 35	72	22	23
Number 36	59	50	50
Number 37	59	18	19
Number 38	80	20§	40
Number 39	200§	‡	30
Convalescent:			
Number 40	663	31	35
Number 41	284	16	26
Number 42	108	8	18
Number 43	902	61	80
Number 44	376	20	36
Number 45	383	15	19

* Numbers are used to avoid revealing the identity of hospitals.
† The total is of little significance since it represents a combination of institutions so dissimilar.
‡ Data not obtainable.
§ Estimate.

Because of the many different kinds of special care afforded, the classification of the special hospitals is difficult and they are, therefore, grouped according to the character of their work, rather than on the basis of their location. One hospital for women, one for incurable cases, and one independent convalescent home are located in Suburban Boston.

Overlapping of work occurs between institutions caring for infants, children, and women and those caring for infants, children, and confinement cases. Of the four institutions which care for infants and children, two were not in operation continuously throughout the year. Four of the institutions accommodating convalescents are only separate departments of hospitals doing a large and varied work. Although three of the last mentioned are located outside of Boston proper, they may well be considered Boston institutions since admission to their care is obtainable largely through the parent institution in Boston.

While the general hospitals cared for 34,356 persons, only 17,963 were cared for in the special hospitals. Two reasons suggest themselves for this: first, the special hospitals average considerably less in size, showing an average of 77 beds as compared with 136 in the general hospitals; second, the average length of stay in the special hospitals is much longer than in the general hospitals.

In the special hospitals the percentage of use to possible use was 67.2, which is lower than the corresponding figure for the general hospitals by 8 per cent. Considering the groups in order, the hospitals caring for infants and children have a percentage of use varying from 50 to 85 with an average of 69 for the group. This low figure may in part be due to the fact that two of the institutions are not open during the entire year, and at the beginning and end of their work they are probably not running at the full capacity. Such open seasons dovetail into each other, one being closed and one open during the summer. This may interfere with exact conclusions and yet the fact that the group as a whole had an unused margin of 30 per cent. of its bed capacity suggests little need of adding more beds. Five general hospitals maintained ninety-two beds for the same class of patients. In the only one for which

figures by departments were obtainable, the children's department was not crowded. The others have small departments.

TABLE VIII.

RELATION BETWEEN THE ACTUAL USE AND THE POSSIBLE USE OF HOSPITAL ACCOMMODATIONS IN THE SPECIAL HOSPITALS OF METROPOLITAN BOSTON, BY INSTITUTIONS, 1910.

Hospitals.*	Number of Hospital Days		Per cent. of Actual Use to Possible Use.
	Possible if the Beds Were Constantly Occupied.†	Actually Given.	
All Hospitals	629,976	423,433	67.2
Infants and Children:			
Number 18	36,500	23,920	65.5
Number 19	6,552	3,324	50.7
Number 20	8,760	7,490	85.5
Number 21	9,875	7,519	76.1
Women:			
Number 22	53,290	25,094	47.1
Number 23	7,830	4,781	61.1
Number 24	5,832	5,311	91.1
Number 25	58,400	25,550	43.7
Number 26	16,107	8,776	54.5
Lying-in:			
Number 27		‡	
Number 28	18,980	13,834	72.9
Nervous Diseases:			
Number 29	18,615	16,485	88.5
Eye and Ear Diseases:			
Number 30	72,050	54,403	75.5
Contagious Diseases:			
Number 31	124,100	96,425	77.7
Number 32	51,100	17,978	35.2
Chronic and Incurable Diseases:			
Number 33	15,695	15,275	97.3
Number 34		‡	
Number 35	8,395	7,848	93.5
Number 36	18,250	18,250§	100.0
Number 37	6,935	6,437	92.8
Number 38	14,600	9,490§	65.0
Number 39		‡	
Convalescents:			
Number 40	12,775	11,331	88.7
Number 41	9,490	5,966	62.9
Number 42	6,570	2,738§	41.7
Number 43	29,200	22,265§	76.3
Number 44	13,140	7,389	56.2
Number 45	6,935	5,554§	80.1

* Numbers are used to avoid revealing the identity of hospitals.

† The figures in the first column as the "number of hospital days possible if the beds were constantly occupied" are obtained by multiplying the average number of beds maintained during 1910 by the number of days in operation during that year (usually 365).

‡ Data not obtainable.

§ Computed.

Of the five institutions caring for women, two also accept children and have maternity departments. Table VIII shows an average of 60 per cent. of use to possible use for this group. The maximum use found in the group is 91.1 per cent. for

hospital number 26, while the beds in numbers 22 and 25 have been in use less than one half of the time. Although figures by departments are not at hand, the two general hospitals which maintain seventy-three beds for women show a comparatively low demand upon their beds as a whole, so that these two departments are probably not crowded, which would indicate that the demand in this direction is satisfied.

Unfortunately, one institution caring for maternity cases has not at hand figures showing the number of days care given its patients. The number of patients treated (260) seems incomprehensibly low when compared with the number of beds maintained (145). This is of general interest only in connection with the fact that the beds of the other institution in the group were in use less than three fourths of the time. The general hospitals maintained only thirty-one beds for maternity work. Evidently this group of institutions does not need immediate additions to its facilities.

Boston has but one institution primarily for the care of nervous diseases, in which the fifty-one beds contained a daily average of forty-five patients. This institution is being utilized very nearly to its maximum capacity since it has less than 12 per cent. margin of unused beds, and at least that amount of margin is necessary for the best service. The general hospitals play practically no part in the care of nervous cases. Not only is the supply in this field hard pressed by the present needs, but the demand will probably increase rather than decrease.

Boston has but one special hospital devoted to the treatment of eye and ear diseases. During the year 1910 this institution added fifty beds to its hospital equipment, bringing the number up to 210. This enlargement was evidently needed since upon one day 195 ward patients were under care. The average use for the year, however, was but 75 per cent. Probably this amount of leeway for this class of patients is not excessive.

Contagious accommodations cannot be considered adequate unless they are ample enough to care for all applicants during an ordinary epidemic. One of the two hospitals has been recently opened to treat contagious diseases of children. In

spite of its low percentage of usage for the year, 35 per cent., during an epidemic in 1910 it was filled far beyond its capacity. The annual report for that year says " . . . the building erected for 100 patients, mostly children, at one time held 170 patients, two-thirds of them adults." The larger hospital, showing almost 78 per cent. of usage, was crowded during the same epidemic. Its annual report for 1910 states " . . . it is of great importance to increase the accommodations for diphtheria and scarlet fever." In past years cots and voting booths have been used to accommodate the overflow of patients. The need for more ample accommodations for contagious cases, which shall be in no way restricted, is apparent.

In institutions caring for chronic and incurable cases the average stay per patient is of longer duration and, therefore, the necessary margin of unoccupied beds is less. For two hospitals the number of days care given was not obtainable. Although the figures quoted for hospital number 36 are as received, they probably should not be taken at their face value, but only as indicating a constant use, since when a vacancy occurs the next person on the long waiting list is instantly notified. The five for which figures are given show 90 per cent. of use of available beds. All say that the demand upon them is great This field undoubtedly demands expansion in the immediate future.

In only one institution caring for convalescents is the percentage of actual use of beds at all indicative of crowding. But although the figures for this group as a whole do not indicate the need of immediate expansion, that conclusion cannot be assumed. Hospitals numbers 41 and 45 are independent organizations and not departments of a larger system, as are the others of the group. All except these two receive convalescing patients primarily from the other departments of their own organizations and the availability of their resources is, therefore, limited. One of these exceptions, located near the edge of Metropolitan Boston, limits its work to women and children; the other, located in Boston, limits its work to women. It is apparent then, that every hospital in this group limits the classes to whom its resources are available.

Considering the hospital system as a whole the need of expansion in different kinds of hospital work in Boston is relative. In three directions immediate expansion is undoubtedly required. The city as a matter of necessity should assure itself that adequate accommodations for all cases of contagious diseases are at hand. This is not true at the present time. Furthermore, the beds for chronic and incurable, and for nervous cases are in such constant use that many who need treatment cannot be accepted as patients. For convalescent cases the fact that all existing institutions limit the class of patients admitted is unfortunate. In other directions the need of additional facilities is less pressing. Certainly the present facilities of the general, the lying-in, and the hospitals for woman do not require immediate enlargement.

One phase of hospital work not included in any of the foregoing figures is the care of ambulatory patients. In the following brief resumé, the work of the benevolent dispensaries of Metropolitan Boston is combined with that of the out-patient departments of the hospitals previously studied. Twenty-nine benevolent dispensaries and out-patient departments were treating patients in Metropolitan Boston in 1910. Clinics for 19 different groups of patients are found in Boston proper, none of them, however, treating contagious cases. Thirteen institutions maintain clinics for general medical and surgical diseases. Clinics for diseases of women; of the ear, throat, and nose; eye; skin; and nerves are the most common special departments.

Almost 99 per cent. of the 191,989 persons treated during 1910, not including accident cases, were treated in Boston proper. Comparing this figure with the population shows that in Boston proper during 1910, 284 persons per 1,000 population used the Boston dispensary and out-patient service. Including the suburbs, however, the number falls to 161 per 1,000 population, which is doubtless a fairer figure.* No figures are at hand admitting a satisfactory comparison of Boston conditions with those of other cities.

Whether ambulatory patients in Boston are increasing or

*The ratios given assume that all patients are residents of Metropolitan Boston. Except for a small percentage in one or two institutions this is probably correct.

decreasing in proportion to population cannot be ascertained by tracing the growth of the system as a whole, because the necessary figures are lacking. However, the growth since 1890 of the ten institutions which in 1910 treated about 85 per cent. of the total dispensary patients is shown in the following table:

TABLE IX.

NUMBER AND PER CENT. OF INCREASE OF PERSONS TREATED IN TEN DISPENSARIES AND OUT-PATIENT DEPARTMENTS IN BOSTON, BY INSTITUTIONS, 1890, 1900, 1910.

Names of Hospitals and Dispensaries.	Number of Persons Treated During			Per Cent. of Increase
	1890.	1900.	1910.	1890–1910
All Dispensaries and Out-Patient Departments:	88,405	139,917	161,730	83.0
Boston City Hospital	12,983	27,328	40,032	208.3
Boston Dispensary	24,456	28,610	30,917	26.4
Carney Hospital	5,380	10,355	15,084	180.4
Children's Hospital	1,712	4,735	6,232	264.0
Free Hospital for Women and Children	512	937	983	92.0
Infant's Hospital	1,000	3,064	2,907	190.7
Mass. Charitable Eye and Ear Infirmary	15,289	26,247	28,906	89.1
Mass. General Hospital	22,545	31,043	22,302	1.1*
Mass. Homeopathic Hospital	0	83	12,036	
New Eng. Hospital for Women and Children	3,268	4,819	2,331	28.7*

* Decrease.

This table does not take into account many organizations formed since 1890—for example, the Mt. Sinai Hospital, founded in 1902, which in 1910 treated 4,728 persons. Only those are included whose history is available and is continuous over the twenty years. If all of the newer dispensaries had been included the increase in attendance between 1890 and 1910 would probably have been at least 90 instead of 83.0 per cent. as indicated in the table. The number of persons treated in these dispensaries per 100,000 population in 1890 was 19,712 and in 1910, 24,118, an increase of over 22 per cent. Although this increase is considerable, a similar one has taken place in other cities—for example, in London, and also in New York, until the passage of the law regulating dispensaries.* Some

*Relative to New York a prominent doctor says, "For more than one half a century the medical charities of this city treated about 16 per cent. of the population as sick and needy poor and fully met the requirements of that class. Now these charities have so multiplied that they give gratuitous medical relief to upwards of 45 per cent. of the population." Dr. Stephen Smith, Charities Review, March, 1898. Among the findings of the committee of the British Medical Association in the "Mission of Hospitals," it is stated that in London in 1877 one person in four received free medical relief; in 1894, one in 2.5; in 1903, one in 2.2; in 1904, one in 2." This is an increase of 200 per cent. for the period. *Hospitals and Charities*, 1907, p. 65. Burdett.

doctors claim that much of this disproportionate increase in dispensary patients is due to a growing use of these agencies by persons well able to pay a private physician. More common claims are that since the increase in the cost of living has outstripped the increase in wages, a greater proportion of persons are not able to pay for medical treatment, and also that a larger proportion of the really needy are receiving such service.

The volume of work in the twenty-nine dispensaries and out-patient departments in 1910 is shown in the following table:

TABLE X.

NUMBER OF PATIENTS, NUMBER OF VISITS, AND AVERAGE NUMBER OF VISITS PER PATIENT IN DISPENSARIES AND OUT-PATIENT DEPARTMENTS IN METROPOLITAN BOSTON, BY INSTITUTIONS, 1910.

Hospitals and Dispensaries.*	Number of Patients.	Number of Visits.	Average Number of Visits per Patient.
All Dispensaries and Out-Patient Departments	191,989	657,256	3.4
Boston Dispensaries and Out-Patient Departments	189,758	650,049	3.4
Suburban Boston Out-Patient Departments	2,231	7,207	3.2
Boston:			
Dispensaries—			
Number 1	30,917	102,282	3.3
Number 2	4,728	14,075	3.0
Number 3	813	4,594	5.7
Number 4	2,013	5,655	2.8
Number 5	239	†	†
Number 6	1,511	3,759	2.5
Number 7	2,656	10,703	4.0
Number 8	913	7,332	8.0
Number 9	2,288	5,957	2.6
Number 10	5,391	13,684	2.5
Number 11	1,419	1,855	1.3
Number 12	1,057	1,389	1.3
Number 13	200	534	2.7
Out-Patient Departments—			
Number 14	15,084	43,887	2.9
Number 15	22,302	124,584	5.6
Number 16	40,032	127,559	3.2
Number 17	12,036	39,640	3.2
Number 18	6,232	26,593	4.3
Number 19	2,907	14,969	5.1
Number 20	920	5,702	6.1
Number 21	2,331	13,486	5.8
Number 22	3,838	10,362	2.7
Number 23	28,906	64,109	2.2
Number 24	33	305	9.2
Number 25	983	7,034	7.2
Suburban Boston:			
Out-Patient Departments—			
Number 26	530	1,524	2.9
Number 27	1,457	4,726	3.2
Number 28	153	610	4.0
Number 29	91	347	3.8

* Numbers are used to avoid revealing the identity of hospitals.

† Not obtainable.

Table X shows that in 1910 one dispensary and five out-patient departments cared for over three fourths (79 per cent.) of the Boston patients and their influence in determining the total is, therefore, noticeable.

The frequency with which doctors persuade patients to return for treatment is also evident in the table. The average, 3.4 visits per person, since it does not include accidents, is not especially high, although it exceeds the corresponding figure for the city of London, in which the out-patient departments of 123 hospitals had an average of 2.7 visits per patient.* It does not, however, exceed the 1907 figure for ten large hospitals and dispensaries, largely devoted to general work, located in New York, Philadelphia, and Baltimore, which shows an average of 3.8 visits per patient.† Comparing separate institutions, the proportion of visits varies with different kinds of work. For example, number 7 does tubercular work only, and in many cases the dispensary visit probably represents the examination only, treatment being arranged for elsewhere. On the other hand number 23 treats women, and its reports for a number of years show that many visits per patient is the rule.‡

It has been shown that the number of persons using dispensaries is increasing much faster than population. Are the number of visits per patient also increasing? This cannot be answered for the group as a whole. Reports of the Boston Dispensary show 1.5 visits per patient in 1890, 2.5 visits in 1898, and 3.3 in 1910. The Fayette Street Dispensary shows 3.1 visits per patient in 1890, 3.9 in 1900, and 5.8 in 1910.

*Journal of the Royal Statistical Society, March, 1909. P. E. Braun.

†Based on the 1907 reports of the institutions, as follows:

	Number of Visits per Patient
Philadelphia Dispensary	2.5
Hospital of the University of Pennsylvania	5.9
Hospital of the Protestant Episcopal Church, Philadelphia	3.9
Women's Hospital of Philadelphia	4.0
New York Dispensary	3.0
St. Luke's Hospital of New York	4.4
Mt. Sinai Hospital of the City of New York	2.4
Society of the New York Hospital	4.5
Bellevue and Allied Hospitals, New York	2.5
Johns Hopkins Hospital, Baltimore	3.8

‡If figures by departments were at hand for a sufficient number of institutions they would be more significant.

The Boston City Hospital shows little variation. The Massachusetts General Hospital shows 2.5 visits per person in 1890, 3.5 in 1900, and 5.6 in 1910. Such increases for these larger institutions, denoting an attempt to have patients return for thorough, continued treatment, are very encouraging.

The Extent of Charitable Work in the Hospitals.

All patients cared for at the benevolent hospitals are recipients of charity to the extent that they receive medical care gratuitously and the endowment of the hospital furnishes funds for their care. Moreover the institution is exempt from taxes. Although patients occasionally pay for every expense of their maintenance, this does not cover the services of the doctors nor the grants of community. With the exception of six special hospitals and one general hospital connected with an almshouse, none of which make any charge, all of these benevolent agencies receive payments from some of their patients.* Hospital reports commonly group such payments with reference to a fixed charge, and not according to what their care costs the institution. The common groupings are "pay,†" "part-pay," and "free."

Deducting from the total the 7,102 patients who, although paying something, could not be classified as pay or part-pay, 68 per cent. of the remaining 45,000 persons were treated at less than full charge, and over 24,000 persons, 53 per cent. of the total, paid nothing. Different classes of institutions determine the proportion of patients treated free in the two groups of hospitals. Among the general hospitals, the city institutions, in which a large part of the patients are treated free, determine the percentage. The percentage for the special hospitals is largely determined by certain institutions, chiefly those caring for incurable cases, which make no charge to any patient.

*This section deals only with patients given bed treatment, i. e., it excludes out-patients.

†The amount which constitutes full pay varies widely in different hospitals, in part because of variation in the cost of different kinds of service, and in part because certain rates have become customary. "Part-pay" patients pay anywhere from trifling amounts to almost full pay.

TABLE XI.

NUMBER OF PATIENTS TREATED IN THE HOSPITALS OF METROPOLITAN BOSTON AND PER CENT. OF THE TOTAL CLASSIFIED AS PAY, PART-PAY, AND FREE, BY INSTITUTIONS, 1910.*

Hospitals.†	Number of Patients Treated.	Per Cent. of Patients Treated		
		Pay.	Part-Pay.	Free.
All Hospitals‡	48,718	32.0	14.9	53.1
General Hospitals	34,356	36.2	13.1	50.7
Special Hospitals	14,362	20.6	19.7	59.9
General Hospitals:				
Number 1	3,674	57.0	17.0	26.0
Number 2	6,392	36.9	5.4	57.7
Number 3	10,834	33.3§	0	66.7
Number 4	4,341	23.8	35.3	40.9
Number 5	1,361	0	0	100.0
Number 6	573	53.4	40.3	6.3
Number 7	1,051	13.5	12.9	73.6
Number 8	440	66.7	4.3	29.0
Number 9	386	47.6	7.8	44.6
Number 10	1,749	38.0	44.0	18.0
Number 11	236	65.7	11.9	22.4
Number 12	895	69.3	21.7	9.0
Number 13	567	49.0	||	51.0
Number 14	806	41.0	||	58.2
Number 15	97	20.6	0	79.4
Number 16	63	30.2	9.5	60.3
Number 17	891	50.4	45.1	4.5
Special Hospitals:				
Infants and Children—				
Number 18	1,678	26.7	5.2	68.1
Number 19	289	1.7	36.0	62.3
Number 20	217	0.4	44.9	54.7
Number 21	462	0	0	100.0
Women—				
Number 22	1,347	67.2	||	32.8
Number 23	214	48.6	24.3	27.1
Number 24	233	47.8	15.8	36.4
Number 25	989	47.0	38.0	15.0
Number 26	464	0	0	100.0
Lying-in—				
Number 27	260	25.0	25.0	50.0
Number 28	863	43.0	22.3	34.7
Nervous Diseases—				
Number 29	187	27.3	40.1	32.6
Eye and Ear—				
Number 30	3,556	19.0	20.5	60.5
Contagious—				
Number 32	483	6.2	74.8	19.0
Chronic and Incurable—				
Number 33	195	0	0	100.0
Number 34	315	45.2	2.9	51.9
Number 35	72	0	0	100.0
Number 36	59	10.2	||	89.8
Number 37	59	57.6	||	42.4
Number 38	80	0	0	100.0
Convalescent—				
Number 40	663	34.0	||	66.0
Number 41	284	0	0	100.0
Number 42	108	6.5	49.1	44.4
Number 43	902	0	15.2	84.8
Number 45	383	4.4	10.2	85.4

* Three hospitals are omitted because of difficulty in classifying their patients.

† Numbers are used to avoid revealing the identity of the hospitals.

‡ The eight hospitals which do not separate those who pay in full from those who pay in part are omitted from the total of the per cent. columns.

§ Estimate.

|| Does not separate those who pay in full from those who pay in part.

Eliminating the city institutions, the general hospitals treated on an average 39 per cent. of their cases free. The relative prominence of free cases is most marked in the group of institutions for convalescents, which treated 78 per cent. of their cases free of charge. The group of hospitals caring for chronic and incurable diseases has an average of over 75 per cent. of free patients, and that caring for infants and children 72 per cent. The average for the convalescent hospitals is high because, except for one independent hospital which does only free work, the group consists of departments of larger hospitals, from which patients are chiefly received, and probably preference is given to those whose home conditions are not helpful toward convalescence, and such are less apt to be able to pay. In addition to the 24,000 persons who paid nothing for treatment, over 6,500 paid only a part of the full charge, making approximately two thirds of the total who were treated at less than the full charge.

For the thirty-six hospitals from which information was obtained, it is shown that 33 per cent. of the patients treated, approximately one patient in three, paid the full charge. Except the one hospital connected with an almshouse, every general hospital had patients paying the full charge. In six special hospitals no patient paid full charges during the year, and the percentage of patients paying them in all the special hospitals is much less than in the general hospitals. Considering both free and pay cases, the special hospitals care for a greater percentage of their patients at less than full charge than the general hospitals.

The residences of the patients admitted to free treatment in sixteen hospitals, caring for approximately 65 per cent. of the cases treated free in Boston, were classified as shown in the following table:

Table XII is based upon over 8,000 cases, more than one half of whom (56 per cent.) were residents of Boston. Approximately 22 per cent. were residents of Suburban Boston. These proportions apply equally to the general and the special hospitals. General Hospital number 8 treats as free cases only residents of Boston because of restrictions in the terms of its organization. Hospitals numbers 2 and 7 furnish free care to

residents from beyond the Metropolitan district to an extent not equalled by the other general hospitals. This is true of one chiefly because its name gives the impression that it is supported by the state; while the other is a part of an organization whose activities extend beyond Metropolitan Boston. In over one half of the special hospitals, at least one fifth of the free cases come from Suburban Boston. Special Hospital number 39 has 43 per cent. of its free cases from beyond Suburban Boston.

TABLE XII.

NUMBER OF PATIENTS ADMITTED TO FREE TREATMENT IN SPECIFIED HOSPITALS OF BOSTON, CLASSIFIED ACCORDING TO RESIDENCE, BY INSTITUTIONS, 1907.

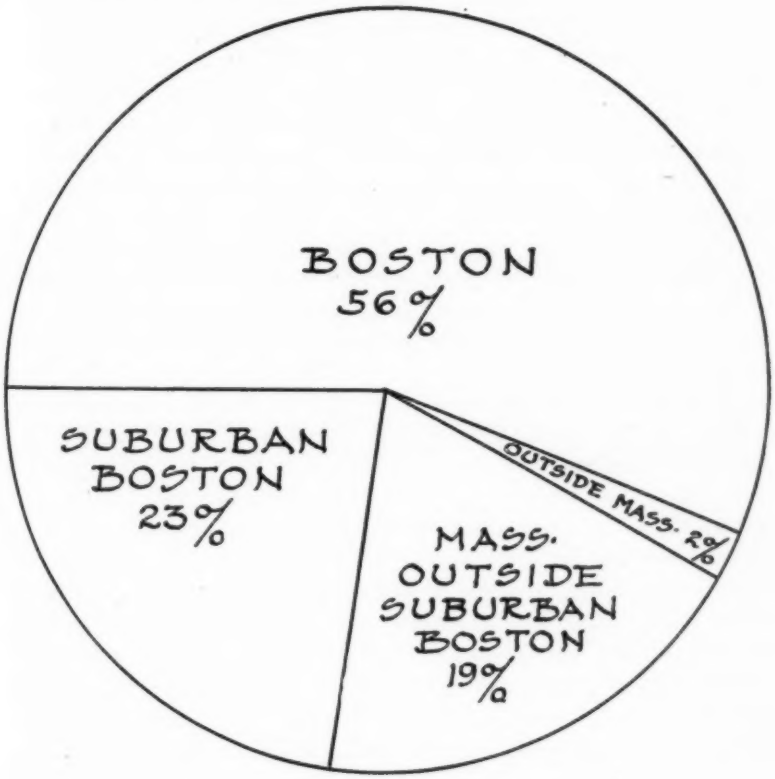
Hospitals.*	Total Number of Patients Admitted Free.	Per Cent. of Total Residing			
		In Boston.	In Suburban Boston	In Massachusetts Outside Suburban Boston.	Outside Massachusetts.
All Hospitals	8,253	56	23	19	2
General Hospitals	5,157	56	24	18	2
Special Hospitals	3,096	57	22	19	2
General Hospitals:					
Number 1	499	78	12	8	2
Number 2	2,743	43	30	25	2
Number 4	1,588	69	18	12	1
Number 6	89	53	26	13	8
Number 7	83	37	19	22	22
Number 8	155	100	0	0	0
Special Hospitals:					
Number 19	169	76	15	9	0
Number 20	100	67	16	12	5
Number 21	366	67	29	4	0
Number 22	344	79	16	4	1
Number 23	65	51	25	15	9
Number 24	48	73	25	2	0
Number 25	144	79	9	10	2
Number 29	65	37	20	43	0
Number 30	1,555	44	23	30	3
Number 33	240	65	21	12	2

* Numbers are used to avoid revealing the identity of hospitals.

Since many of the larger cities in the suburbs have general hospitals of their own, and the other cities have a definite plan of caring for their sick poor, it is evident that the 2,270 persons from outside Boston who received free treatment, chose to come to the general hospitals of Boston, and that the Boston hospitals wished them to come. The 1,331 non-resi-

dents admitted free to Boston special hospitals may have had greater reason for their course, since, possibly, no relief for their particular ailment is afforded at home. To the extent to which doctors and donors contribute to these hospitals this is of course justified. The extent to which the suburban cities are asking Boston hospitals to bear their rightful burden of sick who are unable to pay for treatment is shown in the following diagram:

DIAGRAM SHOWING THE PERCENTAGE OF CASES ADMITTED TO FREE TREATMENT IN HOSPITALS OF BOSTON PROPER, ACCORDING TO RESIDENCE.



Residents of Boston proper are not being treated as free cases in any of the suburban cities. None of the eight general hospitals in Suburban Boston from which information could be obtained treated any cases from outside the home city free of charge.* Whether any of the part-pay patients in the suburban hospitals were Boston residents, and thus recipients of charity, is not known. Although their place of residence was not classified, undoubtedly some of the part-pay patients of the Boston hospitals were suburban residents. Evidently, then, Suburban Boston is not to any extent repaying the city proper for the free care given to its citizens by caring for Boston residents without charge.

Combining the patients treated free in the public hospitals maintained by the city of Boston with the other free Boston patients, approximately a total of 15,442 residents of Boston received free treatment during 1907.† In other words, 2.5 per cent. of the population of Boston received free bed treatment in its public hospitals, which is equivalent to one person in every 40. Such figures indicate the need for care in dispensing so large a charity.

*Irrespective of convalescent departments, in one general and two special hospitals figures were not obtainable. The two special hospitals, however, care for free patients from over a wide area, including Boston.

†The 1907 report of the Massachusetts State Board of Charity states that the Boston City Hospital treated 8,969 free cases. The head statistician and head settlement clerk at the hospital estimated that 97 per cent. (8,699) of the free cases cared for had a city residence. The 1,185 patients at Long Island were all free city cases.

In the special hospitals, for which data were obtained, one half of the total, 57 per cent. of the free cases came from Boston. Assuming for the remainder that 50 per cent. of the free cases came from Boston, gives the total of 2,691 for all. This does not include Boston residents receiving free care in the two special hospitals of Suburban Boston.

STREET ACCIDENTS—NEW YORK CITY.*

By E. S. Clowes, *Statistician for the National Highways Protective Society.*

This paper deals with Street Accidents in New York. Last fall I took charge of the statistical work of the National Highways Protective Society and I have, in the interval, learned enough about street accidents to realize that the problem of their control is a very complicated one—not to be solved in any quack fashion, but only by the force of an aroused and intelligent public sentiment, expressing itself in definite and comprehensive regulations and laws, administered with common sense and impartially enforced.

The dangers of the streets of New York are becoming a national tradition. Clippings come to the society from nearly all over the country stating the numbers of killed and wounded here and expressing editorially more or less humorous comment regarding the agility of New Yorkers and the perils of life in the metropolis. Captain Bob Evans, "Fighting Bob" of Santiago fame, once is alleged to have said that he felt safer on the bridge of a battleship in action than he did when trying to cross Broadway or Fifth Avenue.

For three years past the National Highways Protective Society has been keeping a record of traffic accidents in New York. These have been classified with respect to the vehicle that inflicted them, whether the victim was less than seventeen years old, and whether or not the injury was fatal. The number of fatal accidents has been derived from the coroners' offices of the respective boroughs and are collected each month. I believe this to be more satisfactory than the Board of Health figures, as the Board of Health gets its figures of violent deaths from the coroners' offices, and while accurate with respect to the nature of the injury the Board of Health is not always particular as to the cause of it. How a variation in the figures occurs is easily seen by a little study of the way the coroners'

* Paper prepared for the Quarterly Meeting of the American Statistical Association, New York, April 17, 1913.

records are kept. When the office is first notified of a death all that is entered is the victim's name, the place where the body was found, the coroner assigned to the case, and the proximate cause of the injury, with almost invariably, if it is a traffic case the nature of the vehicle inflicting it. These cases are all entered a second time in a journal where such details as age, occupation, etc., are noted with a more complete description of the injury and occasionally the detailed findings of the coroner's jury. Quite frequently, however, in this journal the cause of the injury is not stated, the record merely reading "Fractured skull," "Crushed pelvis" "Rupture of the viscera," etc., without stating that the injury was due to having been run over. The Board of Health records I think have been largely taken from this journal rather than from the day book because the journal gives the victim's age, civil condition, and a more nearly complete account of the anatomical injury, but for the reasons above stated it is necessary in order to get an accurate list to go over both volumes of records. This the National Highways Protective Society has always done, and its figures at the close of the year agree closely with the coroners' reports.

We classify accidents under Automobiles, which includes all power propelled vehicles not running upon rails; Trolleys, which include all surface electric railways, running upon the highways or streets, and Wagons, which include all animal drawn vehicles. The following classes of accidents are excluded from our record: automobile or motorcycle accidents in which the victim was the driver of the vehicle and where the accident was due solely to his own recklessness, trolley accidents other than collisions in which the victim was an employee in the discharge of his duty, and wagon accidents when the victim was the driver and no one else was apparently to blame. Runaway accidents are counted. Collisions between vehicles are noted and classified by the two vehicles engaged, such as trolley and wagon, automobile and trolley, etc., and the death or injury is blamed upon the stronger class of vehicle in the encounter. In automobile and trolley collisions the blame is put upon the automobiles as it is the more easily controlled and has greater freedom of action. Colli-

sions, however, are responsible for very few deaths, for instance in the years 1910–11–12 out of 473 automobile fatalities, only thirteen were due to collisions. The remainder represented pedestrians run down.

Our figures for injury are derived from newspaper clippings and are undoubtedly much below the mark, although we get clippings from pretty nearly every newspaper printed in English in Greater New York, some of which, such as the *Home News* and the *Greater New York Star* are probably unfamiliar to most of the city's residents. I think we get 90 per cent. of the serious accidents, but many minor ones go unreported, and at times when the papers are full of important news, as they were after the loss of the "Titanic" or during the recent floods in the West, many accidents are unrecorded.

Since the first of December last, I have kept a name record of every accident, either reported in the papers or from the coroners' offices to which, in addition to the usual details, I have added such information as, driver drunk, victim deaf, mute, driver ran away, taxicab, ambulance, doctor's car, owner driving, driver exonerated, or whatever I thought might be of possible interest. Some of these in time will present features of interest.

So much for the way in which the records are kept. I think that for purposes of comparison and study it will best suit our purpose to consider only the fatal accidents. Even they could provide material for a longer article than I feel that I have at present time to prepare, but a briefer study will not be entirely sterile if not of conclusions, at least of interesting leads for further study.

The first thing to notice is that automobile fatalities are progressively increasing, while those due to trolleys and wagons are nearly stationary from year to year. Automobile deaths in 1910 were 112, in 1911, 142, and in 1912, 221; for the first three months of 1913, there were 51 against 39 last year. Trolley deaths in 1910 were 148, in 1911, 109, and in 1912, 135. Wagons showed 201, 172, and 176, respectively, for the three years. This shows the way automobile fatalities are increasing and is interesting also in that last year automobiles, for the first time, caused more deaths than any other class of

vehicles. The increase has been largest in the Borough of Manhattan, the most congested borough, least in Richmond, the least congested, the increase over the year 1911 being zero in the latter against about 62 per cent. in the former, and 56 per cent. for the whole city. Brooklyn shows about the average increase, but Queens shows 100 per cent. increase due probably to the fact that several of the speedways to Long Island lie through this borough.

In all classes of street accidents, children furnish much more than their share of numbers. According to the United States Census of 1910, 28.7 per cent. of the inhabitants of this city were under fifteen years of age. It would be a safe guess that the figure for those sixteen or less, which is the National Highways Protective Society's classification of children, would be close to 30 per cent. Proportionately to the population, then, children should furnish 30 per cent. of the traffic fatalities. On the contrary they have furnished during the last three years 42 per cent. of such fatalities. The vehicle that has been relatively most fatal to children is the wagon, as children were the victims in 49 per cent. of the fatal wagon accidents. Automobiles are just at the average, trolleys are relatively safest with 33 per cent. or little above the normal proportion. Perhaps these figures might be explained in the theory that in the tenement district where most of the children live, and where they spend nearly all day on the streets, wagons furnish the principal part of the traffic. Trolleys are relatively safer for children because even the child soon knows he is safe if he will only keep off the tracks, and the motorman is particularly careful if he sees a child running into danger, whereas he thinks the adult is able to look after himself.

We have seen, then, that the killings from automobiles now exceed those from either trolleys or wagons, and that they are rapidly increasing, while those due to the last two causes remain nearly stationary. We have also seen that children furnish an undue proportion to these fatal accidents, and that wagons are relatively the most fatal vehicle for them. With these and subsequent data let us see if we can get any clue toward a reasonable method for preventing these fatalities.

Along any street or highway the four factors that enter into accidents are: congestion of the highway, the speed of the vehicle, the carelessness of the driver, and the negligence of the victim. The latter is what one might call a "human constant" which for purposes of comparison can be disregarded. The carelessness of the driver is in part proportionate upon his fear of punishment, and there remains the other variables of congestion of the street and normal speed of the vehicle. The congestion of the street is due to two factors, the density of the population and the mileage of the streets per unit area. It might be reduced to one factor, the density per street mile, but that would overlook the diminishing effect upon traffic accidents of vacant spaces not traversed by streets where children may play in safety. The five boroughs of this city offer excellent grounds for comparison: Manhattan is densely populated, Brooklyn and Bronx are of the density of the average city, and Richmond entirely and Queens outside of Long Island City are suburban or even rural in their character.

I have, therefore, worked out a comparison for these five boroughs. I have taken for purposes of comparison the automobile figures for the last year as the rate of increase has been so great that the figures of two years ago would have little present application. Because of improvements in the trolley system of Brooklyn about two years ago, which caused that year a marked drop in the death rate, I have taken the trolley figures for 1911–12. For wagons I have taken all three years. Figuring on this basis the fatal accident rate per million per year shows that Manhattan has the highest rate for wagons and Queens the highest for both automobiles and trolley, although the rate for trolleys for Queens, Bronx and Manhattan are close together, being 30, 29, and 27 respectively. Manhattan stands second on the automobile list, the Brooklyn last and next to last in trolley accidents. In other words, the fatal wagon accident rate per million is highest in the most congested borough while for automobile and trolleys it, although high there, is exceeded by the next to the least congested borough, which happens to be one which in proportion to its population endures a very large automobile traffic, and this auto traffic as well as the trolley traffic, is largely along highways where high speed can be maintained.

There is another interesting basis of comparison. If we divide the street mileage in any borough by the number of fatal accidents, we get a figure representing the number of miles of road for every such accident. Reduced to a per annum basis, these show that for any given stretch of road Manhattan excells in all classes of accidents, followed by the other boroughs in proportion to the density of their population. In order to see how closely this proportion held I multiplied the figure representing the miles of street per accident by the population per acre for each borough, and although the latter varies as much as 200 and 38 for Manhattan and Brooklyn, and the accident rate varied from 3.6 to 20 I found that the six products derived by multiplying these two factors for these two boroughs for each class of traffic, only varied from 608 to 880 showing a pretty well defined relation between accidents and population density mileage of streets. In making these comparisons of course the trolley mileage was used for the trolley figures, not the general street mileage. For the other boroughs the relation did not hold so well owing to the fact that the street mileage there is small with relation to the area.

Summed up, all these figures seem to show in general that wagon accidents are a function of population density and that automobile accidents are a function of population density and the speed at which the vehicle is likely to be run. The protective effect of a low density of population is seen to be overcome by the presence of sketches of road over which many automobiles pass at very high speed. Two remedies are needed. First relieve congestion. We have already seen that nearly half the victims are children, particularly those killed by slow moving wagons. If sufficient playgrounds could be established to take the children off the streets it would save more than half of them, as fully that many are killed while at play. All trolley cars should be equipped with a powerful air or power brake. Nearly all are in Manhattan and Brooklyn, where notwithstanding congestion the rates are lower than in some of the outlying boroughs. Efficient fenders should be provided.

With respect to automobile fatalities which now exceed

those due to any other class of vehicles, the taking of children off the streets would help some, and speed regulations more, but there would be little need of the latter, if every driver realized that a fatal or serious accident would mean for him either the loss of his means of livlihood or the deprivation of the use of his property.

Finally, the figures for a few other large cities as compared with New York might be of interest.

In 1912 there were 532 fatal traffic accidents in New York.

In 1911 there were 410 fatal traffic accidents in London.

In 1911 there were 236 fatal traffic accidents in Paris.

In 1911 there were 129 fatal traffic accidents in Berlin.

This gives a fatality rate per million for these cities for these years as follows:

New York	106	Paris	81
London	56	Berlin	64

This confirms the general impression that Paris is the most dangerous and London the safest of the European cities, but New York exceeds even Paris and has very nearly double the rate of London where traffic regulations are strictly enforced.

MILES OF STREET PER ACCIDENT.

	Autos.	Trolley.	Wagon.
Manhattan	3.6	4.2	4.4
Brooklyn	20.	16.	18.
Bronx	25.	13.	33.
Queens	46.	20.	224.
Richmond	105.	62.	100.

POPULATION PER ACRE.

Manhattan	200.
Brooklyn	38.
Bronx	20.
Queens	4.8
Richmond	2.5

POPULATION PER ACRE TIMES MILES OF STREET PER ACCIDENT.

	Autos.	Trolley.	Wagon.
Manhattan	720	840	880
Brooklyn	760	608	684
Bronx	500	360	660
Queens	221	96	1075
Richmond	262	155	250

FATAL ACCIDENT RATE PER MILLION PER YEAR.

	Autos.	Trolley.	Wagon.
Manhattan	52.5	27	43
Brooklyn	30.	19	33
Bronx	36.	29	27
Queens	65.	30	14
Richmond	33.	11	33

OCCUPATIONAL MORTALITY AND CAUSES OF DEATH.*

By Dr. Jacques Bertillon,
Chief, Bureau of Municipal Statistics, Paris.

[Dr. Jacques Bertillon, as the representative of France, gave an evening address at the recent International Congress on Hygiene and Demography upon "Occupational Mortality and Causes of Death," the English translation of which will shortly appear in the Proceedings of the Congress. It was suggested that this article, being of great interest to statisticians, might be reprinted by the Statistical Association. But since it was delivered Dr. Bertillon has treated the subject more elaborately in the *Recueil de Statistique Municipale de la Ville de Paris*, Vol. III, No. 4, pp. 1–186. In view of this fact the general explanations prefacing his extended discussion are submitted to the members of the American Statistical Association in the hope that the translation may interest American students in a field upon which our own figures throw very little light, may lead many to a study of the full article, and may warn some against the many pitfalls with which this field of statistics is strewn. Walter F. Willcox.]

Although the study of mortality and of the causes of death by occupation is of the first importance from the standpoint of social progress, the tabulations that permit it are very few. Statisticians have been prevented from pursuing the investigation by its extreme difficulty.

Sources. Only two statistical bureaus (that of the City of Paris and that of England and Wales) give information about the chief causes of death that affect the main occupations. (In Switzerland information is given only for tuberculosis and deaths from violence.)

Tabulations giving the statistics of deaths without specifying the cause are a little less rare.

The best tabulations which we have been able to use in the

*Translated by Kate M. Schutt.

study of occupational mortality are four collections of English figures, the first published by the illustrious William Farr (1860–61 and 1871), the second by his successor Ogle (1880–82), and the figures collected by Tatham (1890–92 and 1900–02). In the three later periods the principal causes of death have been distinguished (in 1880–82 as an experiment only).

The Scotch statistics furnish analogous information to that of the English for 1890–92 and 1900–02, those years having been chosen for this study because they are near a census. The results agree remarkably with the English.

The *Statistische Monatschrift* has published a table of mortality of the workingmen of Vienna.

In Switzerland a table of occupational mortality was given by Kummer and his successors during the twelve years 1879–1890.

I am the author of two tables of occupational mortality from tabulations made by the City of Paris; the one is a report for the five years 1885–9 (near the census of 1886)—the first table of its kind made in France; the other relates to the years 1890–9 and distinguishes the causes of death.

Recently statistics have been published for the City of Leipzig and its suburbs showing the mortality and morbidity for each occupation by age and, unfortunately, not by disease but by groups of diseases. The plan of these statistics is excellent; unfortunately the number of years of life observed is much too few to make the study serviceable.

Finally, just as this work is sent to the printer, the General Statistical Office of France furnishes us a table of mortality by age and occupation based upon figures for 1907 and 1908.*

I shall collate the results of these twelve tables, comparing the figures for each occupation with the general average for the country. Frequently I have found that the same occupations in different countries give analogous results.

I have compared these results with two tables of occupational morbidity drawn up by Bodio from the experience of Italian benefit societies.

The Prudential Insurance Company of Newark published in 1912 three important diagrams relative causes of death by occupation. Unfortunately the number of lives at risk is not known.

Before beginning this comparison, it is proper to put ourselves on guard against the numerous causes of error which the figures present.

Technical difficulties. Nothing requires more discrimination than the construction of tables of occupational mortality. It can truly be said that they are built upon shifting sand. Obviously the calculation of this ratio, "To 1,000 butchers, how many butchers died?" presupposes that one knows: (1) the number of butchers living; (2) the number who died. Now, one cannot know either of these numbers exactly. In fact, on the census day a certain number of butchers think they answer the question about their occupation correctly with the word "merchant" without saying what sort of business they carry on; while their clerks call themselves "employees" without saying in what sort of employment they are engaged. So one cannot know exactly the number living in each occupation. For similar reasons one cannot know any better the number dying in each occupation.

But worse still. In the preceding it would not be half so bad if we could be certain that the same individual who on the census day pompously declares himself a "merchant" will be designated as a merchant on his death certificate. Unfortunately nothing assures us that he will be.

On the other hand, frequently one person is engaged in several occupations at a time; in that case, it is a rule that the principal one should be reported. But who can say whether the occupation reported as principal on the census day will be considered the principal one on the day of death?

The importance of these difficulties should not be exaggerated. A declaration of the occupation is demanded many times in ordinary life; it serves as a sort of complement to the family name as a means of fixing identity. Therefore most men shape a customary answer from which they do not readily depart. Then, if the question relative to occupation is asked in the same way on the census schedule and on the certificate of death, it is likely that the answer will be the same. This will be very brief and probably incomplete, but it will be uniform.

From these considerations the following conclusion may be

drawn: "It is wise not to calculate mortality except for the most clearly defined occupations."

That is the reason for the extreme care with which William Farr set about the construction of his tables. In 1860–61 he calculated the mortality for only a score of occupations chosen from among the best defined. The agreement of the results of 1871 with the earlier ones showed the advantage of extending these studies. Ogle and Tatham, although they fully recognized the difficulty of the problem, were able to extend their investigations to a hundred occupations. The Swiss table likewise has been purposely confined to a limited number of occupations.

Of the 236 occupations distinguished by the Parisian census of 1886 and by the classification of deaths worked out under my direction, I preserved only 43 in my table for 1885–9 and 57 in that for 1890–9.

To this difficulty another is added against which it is easier to be on guard. The lists of occupations often distinguish the industrial occupation from the commercial; but in practice the distinction is very difficult, for, in ordinary usage, the manufacturer of hats and the merchant who sells them both call themselves *hatters;* in the same way, the words, *hosiers, clothiers, jewellers,* etc., are applied to those who manufacture and those who merely sell. So confusion is inevitable. Therefore, to get the figures for my table I have always combined merchants and those engaged in manufacturing the same articles. The same is true of the English nomenclature, which almost always confuses manufacturers and merchants under generic titles such as "engaged in iron," "engaged in wool," etc.

Difficulties of interpretation. Finally, if we have exact and adequate figures, difficulties of interpretation present themselves.

Above all, it is essential that occupational mortality be studied by age. If age is not distinguished, one will find that landlords, for example, show a high mortality. In their occupation, which is not at all laborious, there is nothing unhealthful. Their high mortality arises solely from the fact that landlords are for the most part aged men, enjoying in

their old age what they have acquired in earlier years. They have, then, the mortality of the aged, because they are old. If their deaths be classified by age, their death rate at every age will be found very low. On the other hand, if the deaths of soldiers be studied without distinction as to age, a low death rate is found; that depends solely upon the fact that soldiers are usually young; if their deaths be classified by age, their death rate is found to exceed the average showing that, despite the progress of military hygiene, the military profession is quite unhealthful.

We have to reject a great many studies of occupational morbidity and mortality, because this indispensable distinction has not been made. In my opinion, such studies are of no service.

At the same time, a table of occupational mortality classified by age is very difficult to interpret. If the figures are entirely accurate; if they are large enough to permit conclusions to be drawn; and if for a given occupation we find similar results in many countries, our task will not be ended. It will not yet be proved that we have found a measure for the degree of healthfulness of that occupation.

The situation is this: some occupations demand that those who carry them on should be strong. Why should it be surprising that their mortality is low? That does not signify that the occupation in question is healthful, but only that those who engage in it have been selected from among the country's strongest men. Here again the classification by age is valuable. If such an occupation is unhealthful, the mortality will be low in youth (because the selection of the better stock will produce that result) and will rise rapidly from the 25th or 30th year. That will be evidence that the occupation is unhealthful. But that evidence will fail when the occupation demands so much strength that men who have become enfeebled must enter another occupation. In that case the figures will deceive us entirely, and the death rate at each age will be low, although the occupation is unhealthful.

On the other hand, sedentary occupations which do not necessitate hard muscular effort are sought by weaker persons who have neither the ability nor the inclination to work very

hard. Such are the occupations of the tailor, shoemaker or clockmaker. Why should it be surprising if these show a large proportion of deaths? That high mortality proves the weakness of those who enter the occupation but does not prove that the occupation is unhealthful. Here the study of the mortality by age will be helpful. If such an occupation is healthful in itself, we shall find a somewhat high mortality in youth, but (after the supply of consumptives and other invalids shall have been exhausted) a lower mortality at succeeding ages.

But this is not always so. Some occupations easy to learn become the refuge of the weak after they have broken down in some other. Such are those of huckster, pedlar, day laborer, etc. Those occupations have a high mortality at all ages, but this does not show them to be unhealthful. It is those who engage in them who are unhealthy.

The difficulties mentioned, which render the construction and interpretation of occupational mortality tables so dangerous, are even more serious for women than for men. So, like my English and Swiss predecessors, I have given up computing any figures for women. My tables apply only to males.

Necessity of comparing the figures for any occupation with a corresponding average. In this comparison one must not forget that, other things equal, the average mortality at each age in Paris is much higher than in the mountains of Switzerland or even in England. So, we must expect that, other things equal, an occupation will show a higher mortality in Paris than in Switzerland. Consequently for the comparisons we are undertaking, attention must be fixed constantly upon the average male death rate of the region under consideration. This general mortality for each age is the average male death rate at that age in the region under consideration; the death rate of each occupation, compared with this general average, indicates what the occupation adds to or subtracts from this average mortality.

Does one want to determine the mortality of Swiss printers? Their mortality at each age is compared with the general mortality of Swiss men at the same age; it is found that their death rate is high. Does one next wish to see if the same is

true in Paris? The death rate of Parisian printers at each age is likewise compared with the average Parisian death rate at the same age. It is found also that the mortality of Parisian printers exceeds perceptibly the average for Paris. It is the same in England, and we must conclude that this occupation is unhealthful in the three countries studied. On the other hand, one does not reach a significant conclusion by comparing the mortality of Swiss printers with that of Parisian printers. One should, then, compare the death rate of Swiss printers with that of Swiss men of the same age and note the difference between them; then compare the death rate of Parisian printers with that of Parisians of the same age, and note the difference between them; one finds, as I have said, that the difference is of the same nature. In general it appears that the occupations which are unhealthful in Switzerland and in England are equally so in Paris.

Numerical interpretation of my statements. The exact meaning of the verbal expressions I shall use is apparent from the preceding considerations. The words "very frequent," "frequent," "rare," "very rare," employed to indicate the degree of frequency of a cause of death in a given occupation, are equivalent to the more exact phrases: "much exceeds the general average for males," "exceeds perceptibly," "is perceptibly less" or "is much less." The words "average frequency" mean "deviates little from the average."

One may say, *e. g.*, that valvular diseases of the heart are very frequent among fishermen (*i. e.*, they are much more frequent among them than they are on the average among other men) and that tuberculosis is very rare among them (*i.e.*, much more rare than among other men), although to 100,000 years of life at age 35–44, tuberculosis causes 194 deaths among fishermen and valvular diseases of the heart only 62.

A uniform rule has been followed in the choice of the words "very frequent," "frequent," "rare", "very rare."

To facilitate the reading of my tables, figures representing the expressions "rare," or "very rare" have been set in italics; those representing "about the average," in Roman type; and those representing the words "frequent" or "very frequent"

in bold-faced type. Finally, heavy type is reserved for the figures representing exceptionally low or high rates.*

The classification of occupations from the sanitary point of view.

We have seen that in each occupation it is necessary to estimate the frequency of each disease at each age. In order to draw general conclusions from this multitude of figures, it is indispensable to classify the occupations from the hygienic point of view.

Others who have attempted such a classification have simply mentioned the occupations affected by some special disease, such as malignant pustule among tanners, lead-poisoning among painters; they have had in mind also the causes commonly assigned for some common diseases, such as humidity as a cause of rheumatism, cold as a cause of pneumonia, dust as a cause of tuberculosis, and after this fashion they have classified occupations. Such a method is the best one available when statistics are lacking; nevertheless, it is very imperfect in assigning too much importance to certain occupational diseases which cause very few deaths. It makes a more serious mistake in that it conjectures what is probable instead of being founded upon the facts.

I have proceeded in a very different way. Taking statistical data as my starting point, I have classified occupations according to whether (1) tuberculosis is rare, of average frequency, or frequent. Within each of these three classes I have distinguished three groups according to the frequency of (2) other diseases of the respiratory system. In each of these new groups I have distinguished three sub-groups according to the frequency of (3) diseases of the circulatory system; and so I have proceeded to consider in turn the frequency of (4) diseases of the liver, of (5) nephritis, and of (6) diseases of the nervous system, more particularly after 40 years of age,

*These classes have been determined as follows: the minimum frequency is subtracted from the average and the difference divided by 5. Between the minimum value and that value plus $\frac{2}{5}$ of this difference is the class "very rare"; between that point and another $\frac{2}{5}$ is the class "rare." By adding another $\frac{1}{5}$ the average is reached. From the maximum value the average is substracted and the difference divided by 5. To the average $\frac{1}{5}$ is added to obtain the upper limit of the class "average"; another $\frac{2}{5}$ is added to obtain the upper limit of the class "frequent" and another $\frac{2}{5}$ to get the upper limit of the class "very frequent." The classes "exceptionally high" and "exceptionally low" cannot be measured.

i. e., when the occupation has had time to show its good or bad influence.

By making three classes under each of these six groups of causes of death I have made $3^6 = 729$ sub-groupings of occupations. The occupations then group themselves so naturally that, despite appearances, it is easy to summarize this great table under three groups: A—Occupations in which tuberculosis is very common or of average frequency; B—Occupations in which tuberculosis is rare but diseases of the liver are common or of average frequency; C—Occupations in which tuberculosis is rare and diseases of the liver and kidneys are also rare.

* * * * *

The entire study, introduced by the foregoing paragraphs, is divided into three parts. The first part examines in succession the several causes of death; the prevalence of each cause in the main occupations according to the English and the Parisian tables is presented and some general conclusions drawn. The second part, of which only selections have been published, examines in succession the several occupations; for each occupation the diseases to which it is subject are shown from the figures contained in the first part. In this way eleven occupations are examined. Most of the material necessary for a similar study of the other occupations can be found in the first and third parts. The third part is concerned with occupational mortality not distinguishing the causes of death, but comparing, so far as possible, the results found in the twelve published tables of occupational mortality.

"GRESHAM'S LAW" AS APPLIED TO IMMIGRATION TO HAWAII.

By Victor S. Clark.

With a view to ascertaining whether the migration of laborers to and from Hawaii reveals a displacement of whites by Asiatics similar to that described by Gresham's Law in case of currency, the following table and diagram have been prepared. The comparison is between males of working age, of Asiatic and of Spanish-Portuguese birth or parentage respectively. The latter embrace the only white laborers competing with Asiatics. Total populations are not compared because the importation of picture brides from Japan and the sending of Japanese children to Japan to rear and educate introduces abnormal variations. It is not possible to deduct from departures to California arrivals from that state, because figures are not available for all years in question, but existing figures indicate that this does not affect the result. Asiatic aliens cannot migrate from Hawaii to California; but this influences only the absolute increase or decrease of Asiatics, and the diagram shows no change after 1908, when this regulation applied to the Japanese, who at that time and for the preceding years formed the main part of Asiatic immigration. Since 1910 Filipinos have been the largest element of Asiatic origin moving to Hawaii, and these are free to migrate to California.

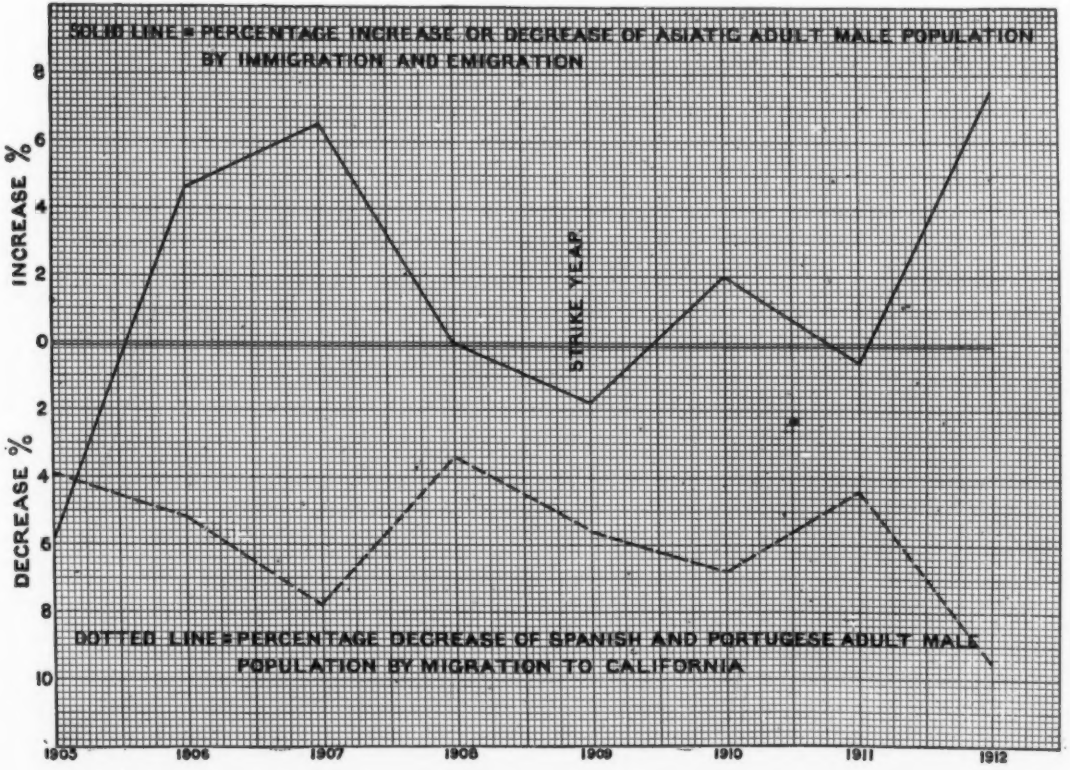
The table gives not only absolute figures, but also the ratio these figures bear to the total adult male population of the two groups in question, respectively, according to the census of 1910. As the Asiatics of this class outnumber the Spaniards and Portuguese ten to one, the ratios only are shown in the diagram. The only year when the decrease of Spaniards and Portuguese by emigration to California did not conform with the net increase or decrease of Asiatics—in general tendency—was 1909, the year of the Japanese plantation strike. That strike apparently contributed to the net decrease of Asiatics during that year, and after the strike the white strike-breakers, receiving their discharge, apparently went to the Coast in

unusual numbers, causing the exceptional phenomenon of an increase in the ratio of white emigration accompanying a net decrease in the Asiatic population.

The presumption is that in case of Hawaii an actual displacement of population along race lines does occur, in accordance with a law that might be formulated in terms similar to Gresham's Law in case of currency.

POPULATION MOVEMENT OF EUROPEAN AND OF ASIATIC MEN COMPETING IN THE LABOR MARKET OF HAWAII FROM 1905 TO 1912, INCLUSIVE.

Year.	Departures of Spanish and Portuguese Men for California.		Net Increase or Decrease of Asiatic Men by Immigration.	
	Number.	Per Cent.	Number.	Per Cent.
1905	−244	3.9	−3803	6.0
1906	−326	5.2	+2934	4.7
1907	−490	7.8	+4090	6.5
1908	−214	3.4	− 80	.1
1909 (Strike)	−351	5.6	−1166	1.8
1910	−429	6.8	+1288	2.0
1911	−279	4.4	− 342	.5
1912	−601	9.5	+4720	7.5


SOLID LINE = PERCENTAGE INCREASE OR DECREASE OF ASIATIC ADULT MALE POPULATION BY IMMIGRATION AND EMIGRATION
INCREASE %
DECREASE %
8
6
4
2
0
2
4
6
8
10
STRIKE YEAR
DOTTED LINE = PERCENTAGE DECREASE OF SPANISH AND PORTUGESE ADULT MALE POPULATION BY MIGRATION TO CALIFORNIA
1905
1906
1907
1908
1909
1910
1911
1912

REVIEWS AND NOTES.

Women in the Bookbinding Trade. By Mary Van Kleeck. Published by the Russell Sage Foundation.

Miss Van Kleeck as secretary of the committee on women's work of the Russell Sage Foundation has made a careful study of the conditions under which women work in the trade of bookbinding. This trade was selected for study because it "illustrates concretely problems common to many other industries." As a part of the publishing business, however, judging from the evidence here at hand, bookbinding is more characteristically *sui generis* than representative. It is largely a subsidiary necessity to the conduct of many forms of business and has grown with the development of the advertisement medium common to modern business methods. Consequently it is frequently the manner and exigencies in the conduct of its employing business which accentuate conditions in the bindery.

New York as a great center of manufacture, commerce, travel, and art has a larger bookbinding business than any other part of the country. The great variety of form which these other interests require in publication matter creates an equally varied assortment of bindery shops. Many of the undesirable conditions would seem to be to a considerable degree dependent on the fluctuations of the other trades. For the same reason the responsibility of the individual consumer is more than usually vague.

Miss Van Kleeck's book is a manual for the student of industrial conditions. With the development of minimum wage boards the compilation of such knowledge about a specific business will be of increasing importance and value. The assembling of material which conveys more than the statistical results of an investigator's work is here well illustrated. Actual interviews with employer and employee are quoted in form sufficiently brief and yet adequate to illuminate the statistics used. By such a method the human values involved are made available to the student.

It is to be regretted, however, that in the presentation of such material a larger public is not in mind. One of the most important contributions to the solution of industrial problems is that of training the women directly involved into a knowledge of their own problems. A more literary method might, it would seem, accomplish both ends; the collection of information for the student, and a readable book for workers and the general public alike. Even by persons reasonably accustomed to reading for facts and inspiration the volume in question will, it is feared, be found somewhat confused, although the facts are there and with them, many intelligent observations. This shortcoming is due to the apparent failure of the investigator to objectify her literary task. We believe that even rather dry statistical material may be so handled as to achieve an artistic result. Here is added matter of warm human interest. This might have been used to better advantage if the material as a whole had been coordinated about the more distinctively salient points of the bindery business as a unique rather than as a representative trade.

The relation of the bookbinding trade to a dozen other kinds of business is, as we have pointed out, perhaps its most salient characteristic. About this fact hang the conditions of overtime, small and large shops, irregularities in methods of work, the adoption of the newest machine or the continuance of older ones. Upon these again rest the apparent difficulties of successfully applying industrial training to the trade.

In the organization of workers, representation in the Allied Printing Trades Council gives the members of the Bindery Union a strong position. There has been sufficient advantage in this alliance to enable a strong women's union to flourish. To it Miss Van Kleeck attributes more important results in matter of hours, training, minimum wage, and protection of individuals than any yet secured through legislation. Identity of interest with other trades created by the very diversity of the printing and publishing business thus serves to counteract some of the disadvantages to which its workers by the same fact are subject.

Any one familiar with the time and patience required to secure the information which Miss Van Kleeck has brought together cannot fail to appreciate the contribution made to specific knowledge by "Women in the Bookbinding Trade." Each chapter will be found of independent value in a study of industrial conditions, particularly those on "Overtime and the Factory Laws," and "Collective Bargaining." That on "Teaching Girls the Trade" is less satisfactory. The objections to training cited are not especially convincing and represent the natural unwillingness of the human mind to entertain a new idea with which those interested in industrial training have been familiar from the beginning. The most serious difficulty lies in the frequent changes in machinery to which the business is liable since, as indicated by this study, it is in a period of irregular transition. With a tendency to concentration in large factories, there is still place for small shops. New inventions are frequent. Their liability deters the smaller places from making radical changes, their introduction makes the factorized product more possible.

ELEANOR H. WOODS.

"*Die Selbstmorde im Kreise Teltow, 1810—1910,*" by Dr. Reinhold Jaeckel. Sonderabdruck aus der "*Zeitschrift des Königlich Preussischen Statistischen Landesamts,*" Jahrgang, 1912. Gedruckt in der Buchdruckerei W. Koebke, Berlin S., Alexandrinenstrasse 99. 26 pages.

Dr. Jaeckel has given an intensive study of the suicides which occurred from 1810 to 1910 in Teltow, one of the suburban sections of Berlin. During this period there were 5,472 suicides, 4,405 of males and 1,067 of females. The numbers and sex distribution are given for each year. The suicide rate was about three times as high during the decade 1901–1910 as during the decade 1811–1820. The rate in Teltow is considerably higher than in Germany as a whole and at the end of the period was nearly twice as high as in the city of Berlin. One reason for this is that many who are residents of Berlin commit suicide in Teltow. At present about four per

cent. of all the deaths in Teltow are by suicide. No attention is given to the method employed or to the age of the victim. As an intensive study in a limited field this monograph possesses considerable value.

WILLIAM B. BAILEY.

The Tokio Statistical Society of Japan recently suffered the loss by fire of the valuable library which it had been over thirty years collecting. It is a pleasure to note that Mr. John Hyde, former statistician of the Department of Agriculture, has presented the society with 3,000 volumes of statistical literature to form the nucleus of a new collection. In addition to official publications of fifty-two countries printed in twelve different languages the gift includes the transactions for a long series of years of most of the leading statistical societies of the world as well as a large number of miscellaneous books of reference.

In accepting the gift the President of the Society, Baron Sakatani, former minister of finance, announced that the library would be given the name of the donor. It is to be hoped that others may be able to help the society to recover from its serious loss. The full title and address of the society are: Tokio Tokei Kiokwai, 6 Yamashiro-cho, Kiobashi, Tokio, Japan.